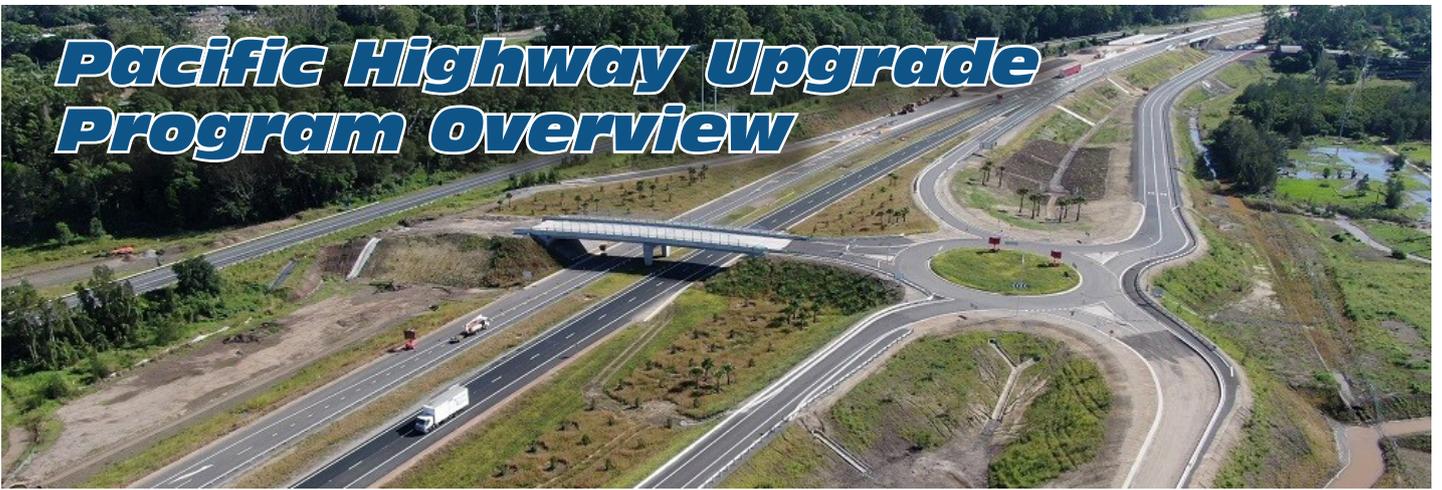


Pacific Highway Upgrade Program Overview



Roads and Maritime Services have delivered the biggest infrastructure investment in NSW history. Over the past five years \$15.9 billion has been invested on projects across the state.

Regional projects have received \$4.8 billion as part of this significant commitment to connecting communities, supporting growth and providing safe journeys to help manage a predicted 15 per cent increase in regional population growth and a doubling of freight movements by 2031.

The agency has delivered 28 major projects in regional communities with 27 major projects in development and thousands of minor and maintenance work projects.

A key part of this regional investment is the Pacific Highway upgrade program.

The Pacific Highway upgrade is Australia's largest regional infrastructure project. It connects Sydney and Brisbane, and is a major contributor to Australia's economic activity.

The Australian and NSW governments have been jointly upgrading the Pacific Highway from Hexham to Queensland since 1996, investing \$11.4 billion in this important upgrade.

When built, it will complete this program of work and help to realise the substantial economic and community benefits of the overall upgrade program providing a four lane divided highway between Sydney and Brisbane.

Over 483 kilometres of the Pacific Highway between Hexham and the Queensland border are now four lane divided road (74 per cent) and about 135 kilometres are now nearly finished being built (20 per cent). This means three in every four kilometres travelled is four lane divided highway.

There are five projects worth more than \$3.3 billion either being built or opened to traffic in the past three year between Port Macquarie and Coffs Harbour.

The 26 kilometre Frederickton to Eungai project opened to traffic in May 2016, the Nambucca Heads to Urunga project opened in July 2016 and in September 2017 the 14 kilometre Kempsey to Kundabung section of the upgrade progressively opened to traffic.

In 2018 the 23 kilometre section between Oxley Highway

and Kundabung and 19.5 kilometres between Warrell Creek and Nambucca Heads also opened to traffic.

Of the remaining 155 kilometres of highway being upgraded between Woolgoolga and Ballina, the 12 kilometre Halfway Creek to Glenugie section opened to traffic in August 2017. The 14 kilometre section between Woolgoolga and Halfway Creek also opened in December 2017 with the final sections between Glenugie and Ballina opening to traffic by 2020.

The highway upgrade has created job opportunities for regional communities on the north coast. By working with industry and local education institutions, pathways into the construction industry have opened up, providing career opportunities beyond the lifetime of the upgrade.

Over the past three years there has been unprecedented progress on the Pacific Highway upgrade as it speeds towards completion by the end of 2020. Work peaked in 2018, with 3700 people directly working on the upgrade, resulting in 9900 indirect jobs.

Travel time savings is another benefit, particularly for the freight industry. A journey between Newcastle and the Queensland border in the mid 1990s once took nine hours to complete. This same journey will take less than seven hours when the upgrade is complete in 2020. Those driving the length of the Pacific Highway are already saving more than an hour and three quarters in travel time.

These upgrades will improve safety and ensure motorists spend more time with their families and less time travelling.

Since work started on the Pacific Highway, the number of fatal crashes has halved, reducing to about 20 crashes annually in recent years.

The Pacific Highway upgrade is more than just a road and has already transformed this part of the NSW north coast contributing to significant regional growth, including direct jobs on the highway but also secondary benefits to local services, tourism and economic development. The highway is used as a local road connecting regional communities and the upgraded highway means the separation between

Designs that take you to new destinations.



local slower traffic and high speed through traffic, including safer local access.

The Pacific Highway upgrade is not only significant because of its size and scale, it traverses some of the most diverse and environmentally sensitive landscapes. It crosses several major river systems and flood plains, coastal ranges, travels through forests and adjoins marine parks. The design and engineering has been created to be sensitive to this environment. It is held as a global benchmark in innovation and is pushing the boundaries in how roads can be built, delivering a legacy for Australia.



PROJECT SNAPSHOTS

Kundabung to Kempsey

Contractors: McConnell Dowell-OHL Joint Venture
 Form of contract: Build only
 Workers on site: 179
 Pieces of large machinery: 21
 Start date of major construction: November 2014
 Completion date: 2017
 Project value: \$230 million
 Australian Government contribution: \$115 million*
 NSW State Government contribution: \$115 million*

Oxley Highway to Kundabung

Contractors: Lendlease
 Form of contract: Design and build
 Workers on site: 344
 Pieces of large machinery: 66
 Start date of major construction: October 2014
 Completion date: Early 2018
 Project value: \$820 million
 Australian Government contribution: \$542.4 million*
 NSW State Government contribution: \$277.6 million*

Warrell Creek to Nambucca Heads

Contractors: Pacifico (Acciona Ferrovial Joint Venture)
 Form of contract: Design and build
 Workers on site: 330
 Pieces of large machinery: 150
 Start date of major construction: December 2014
 Completion date: Early 2018
 Project value: \$830 million
 Australian Government contribution: \$415 million*
 NSW State Government contribution: \$415 million*

Woolgoolga to Ballina Key Statistics

- Building 155km of four-lane divided road
- Bypasses of South Grafton, Ulmarra, Woodburn, Broadwater and Wardell
- Open to traffic by 2020
- More than 75km to be built under traffic
- 10 split-level interchanges
- 170 bridges
- 14.3 million m3 earthwork
- Peak of 2500 direct and 7500 indirect jobs
- Single Environmental Impact Statement for whole 155km project
- About 130 wildlife crossings
- 932 hectares of vegetation clearing
- Biodiversity offset strategy
- Reduction in overall length from 180 kilometres to 167 kilometres, saving about 13 kilometres in travel distance
- Reduce travel time from 130 minutes to about 105 minutes, saving 25 minutes
- Speed limit of up to 110 km/h
- Reduce crash rates by an expected 27 per cent due to divided carriageways
- Improve travel reliability through better flood immunity, fewer incidents and more readily available alternative routes.

WOOLGOOLGA TO BALLINA PACIFIC HIGHWAY UPGRADE OVERVIEW

The \$4.36 billion Woolgoolga to Ballina upgrade is the final link in the Pacific Highway upgrade. The 155 kilometre project will provide a four lane divided road from the northern end of the Woolgoolga Bypass to the southern end of the Ballina Bypass. The Australian and NSW governments are jointly funding the project.

The upgrade has been built using the delivery partner



FORMCON GROUP
 CONCRETE ■ FORMWORK ■ STEEL

Ph: (07) 3386 1235
 Fax: (07) 3386 1245
 admin@formcon.com.au
 67 Enkleman Road Yatala Q 4207
 ABN: 75 201 056 676

model. The delivery partner selection process resulted in Pacific Complete, comprising Laing O'Rourke and WSP, being chosen to work with Roads and Maritime Services to deliver the project, with the contract awarded on 19 June 2015.

Under the delivery model, Pacific Complete works with Roads and Maritime's Pacific Highway Project Office to oversee the project and handle multiple contracts for professional services and building the upgrade.

The delivery partner model supports collaboration and innovation by bringing businesses, workers, consumers and suppliers together. Pacific Complete has packaged the work into small and large packages, providing opportunities for work directly on the project or as subcontractors/suppliers. The project was delivered through a combination of 129 site wide and area specific contracts.

The focus of the first year of procurement was the award four main detailed design contracts, early contracts for foundation treatments and clearing work, site compounds, geotechnical field investigations, and a number of enabling contracts for surveying, environmental services and utility relocations.

The project used site wide contracts for piling, onsite fuel and laboratory testing, precast and concrete supply with major supply agreements in place with nine local quarries for road building material. Seven specific bridge building contracts and three main civil work contracts were awarded.

Ensuring the project was delivering public value was key with six monthly audits of Pacific Complete's quality, safety, environmental, traffic and survey management by Roads and Maritime assuring the client and other stakeholders Pacific Complete met its contractual obligations and identifying opportunities for continual improvement of project systems.

The first sections of the upgrade between Woolgoolga and Glenugie started work in June 2015. The remaining sections between Glenugie and Ballina started work in August 2016, with early work in the Glenugie to Tyndale section.

About 170 hectares of soft soil were treated, about 8.7 million cubic metres of earthwork was moved and 445 piles were installed. Work has been completed on 17 of the 170 bridges being built across the alignment with 15 under construction.



Dirty Creek Range cutting - Woolgoolga to Halfway Creek project



Woolgoolga to Halfway Creek - Kangaroo Trail Road overpass

MAIN PROJECT CONTRACTORS

| Location | Contractor | Earthworks | Bridges | Piling | Paving | Landscaping |
|---------------|---------------|------------|---------|--------|--------|-------------|
| Location Wide | AFS | | | ✓ | | |
| A | Seymour Whyte | ✓ | ✓ | | | ✓ |
| | FKG | ✓ | | | | |
| | BGC | ✓ | ✓ | | | ✓ |
| | BMD | | ✓ | | | |
| B | BMD | | | | | |
| | Davbridge | | ✓ | | | |
| | Goldings | | | | | |
| | BHA | | ✓ | | | |
| | tba | ✓ | | | | |
| C | SEE Civil | | | | | |
| | BHA | | ✓ | | | |
| | CPB | ✓ | ✓ | | ✓ | ✓ |
| D | Lend Lease | ✓ | ✓ | | ✓ | ✓ |
| | Quickway | | ✓ | | | |
| E | Pacifico | | ✓ | ✓ | | |
| F | Lend Lease | | ✓ | ✓ | | |
| P2T3 | Georgiou | | ✓ | | | |

ACHIEVEMENTS TO DATE

- Detailed design completed
- Most early work completed
- Soft soil work well progressed
- Most contracts awarded
- Site compounds built
- Utility relocations well progressed
- Threatened species management plans approved
- Construction environment management plan approved



- Ecological impact assessments
- Approvals and permits
- Environmental management plans
- Nest box installations
- Preclear surveys
- Fauna spotter catchers
- Water quality sampling
- Environmental compliance and auditing

www.ecosure.com.au • 1300 112 021

PROJECT SNAPSHOTS

Woolgoolga to Halfway Creek

Workers on site: 89

Pieces of large machinery: 82

One contractor company on site

Complete

Halfway Creek to Glenugie

Workers on site: 188

Pieces of large machinery: 15

One contractor company on site

Complete

Glenugie to Maclean

Workers on site: 240

Pieces of large machinery on site: 96

Five contractor companies on site

Complete

Maclean to Devils Pulpit

Workers on site: 293

Pieces of large machinery on site: 65

Eight contractor companies on site

Complete

Devils Pulpit to Richmond River

Workers on site: 161

Pieces of large machinery on site: 62

Five contractor companies on site

Complete

Richmond River to Ballina Bypass

Workers on site: 103

Pieces of large machinery on site: 15

12 contractor companies on site

Complete

The project was divided to enable work to be carried out simultaneously across the 155 kilometre alignment.

The 26 kilometre Woolgoolga to Glenugie upgrade has been built in two sections. The first section is the Woolgoolga to Halfway Creek project. This project involves upgrading 14 kilometres of highway to four lane divided road between Arrawarra Interchange and south of Grays Road at Halfway Creek.

The second section is the Halfway Creek to Glenugie project which has recently opened to traffic. This project involved upgrading 12 kilometres of highway to a four lane divided road between Grays Road and Franklins Road at Glenugie.

Civil Mining and Construction delivered this section of the upgrade.

The Glenugie to Maclean section of the upgrade is 48 kilometres long. It includes the 35 kilometre Glenugie to Tyndale section and the 13.2 kilometre Tyndale to Maclean section. It will link to the Halfway Creek to Glenugie section in the south and the Maclean to Devils Pulpit section to the north.

FK Gardner and Sons delivered early work and soft soil treatments, Seymour Whyte Constructions Pty Ltd has built

bridges at 20 locations between Glenugie and Tucabia and BMD Constructions Pty Ltd has built bridges at nine locations between Tucabia and Tyndale plus the new bridge over Shark Creek. Seymour Whyte has also delivered main civil work for the Glenugie to Tyndale section and BGC Contracting delivered main civil work for the Tyndale to Maclean section.

The Maclean to Devils Pulpit section is 28 kilometres long. It includes the 14.4 kilometre section between Maclean and Iluka Road at Mororo and the 9.2 kilometre section between Iluka Road and the Devils Pulpit upgrade. It included resealing about four kilometres of the previously upgraded Devils Pulpit upgrade. It has linked to the Glenugie to Maclean section in the south and the Devils Pulpit to Richmond River section to the north.

In this section of the upgrade Golding Contractors is delivered early work and soft soil treatment. Beilby Hull Albem Joint Venture built bridges at 19 locations between Maclean and Iluka Road.

The Devils Pulpit to Richmond River section is 34 kilometres long and includes a 15.3 kilometre section between Devils Pulpit and Trustums Hill, an 11.2 kilometre section between Trustums Hill and Broadwater National Park and a 7.5 kilometre section between Broadwater National Park and Richmond River.

It has linked the Maclean to Devils Pulpit section in the south and the Richmond River to Ballina Bypass section to the north.

In this section of the upgrade, SEE Civil Pty Ltd delivered early work and soft soil treatments. CPB Contractors Pty Limited delivered main civil work and Beilby Hull Albem Joint Venture built bridges at 12 locations between Trustums Hill and Broadwater and the new Mororo Bridge.

The Richmond River to Ballina Bypass section of the upgrade is 19.5 kilometres long. It included 12.2 kilometres of highway upgrade between Richmond River and Coolgardie Road and a 5.5 kilometre section between Coolgardie Road and Pimlico. It has joined the Devils Pulpit to Richmond River section to the south and link to the 1.8 kilometre Pimlico to Teven section to the north which was delivered by Georgiou Group Pty Ltd.

In this section of the upgrade, SEE Civil Pty Ltd delivered early and soft soil treatments, Lendlease Engineering delivered main civil work and Quickway Constructions has built bridges at 14 locations.



MULLIGAN GEOTECHNICAL PTY LTD

- Geotechnical Drilling & Investigation
- Environmental Water & Soil
- Slope Stabilisation
- Soil Nailing
- Rock Bolting
- Vertical & Horizontal Drilling.

INVESTIGATION & DIFFICULT ACCESS DRILLING SPECIALISTS

PH: 02 6076 9337
MOB: 0427 769 337
Fax: 02 6076 9328

admin@mulligangeotechnical.com.au PO Box 85 Khancoban NSW 2642



Banana Road culvert base slab being poured



Early work in Glenugie to Maclean section



Iluka region May 2017

DESIGN

The project completed detailed design for the four major areas of work. Detailed design for the two major bridges of the project, the new bridge over the Clarence River at Harwood and the new bridge over the Richmond River at Broadwater .

The Urban Design and Landscape plans for the Glenugie to Ballina Bypass sections, included the new bridge over the Clarence River at Harwood were submitted to the Department of Planning and Environment (DP&E) in June 2017.

DESIGNING THE HIGHWAY

- 1538 designers
- 360 design lots
- 22,000 issued for construction drawings
- 735,600 design hours

SAFETY

The careful management of safety for workers and the travelling public is of paramount importance to the Woolgoolga to Ballina project team.

Separate Yourself Site Controls

The Woolgoolga to Ballina project is one of the first Pacific Highway upgrades to implement new site compound safety markings aimed at standardising the way project worksites separate heavy and light vehicles, machinery and pedestrians.

The Roads and Maritime Services “Separate Yourself, site safety it’s no accident” campaign was rolled out in mid 2017 to each site on the Pacific Highway upgrade.

The program was developed in collaboration with Pacific Highway contractors. It ensures a similar look and feel and a consistent approach to controls and their use across project sites to reduce potential confusion for personnel who may not be familiar with particular site arrangements.

The Woolgoolga to Ballina team and its contractors collaborated on a number of safety initiatives across the project. Examples include equipment developed aimed at minimising the need to manually lift and move large, heavy rolls of geo-fabric for soft soil work.

The rolls of geo-fabric, which can vary in weight from 240 kilograms to 1000 kilograms pose manual handling issues.

During work by See Civil to place thousands of square metres of geo-fabric at the Wave 2 site between Coolgardie Road and Ballina Bypass it was determined the manual handling risks to workers were unacceptable.

A lifting and placing device was developed in partnership with Ballina based company Paul Nielsen Fabrications.

The device was manufactured, tested, certified and trialled in the field. It removes the need for manual handling, minimising work health and safety risks, including manual handling related injuries.

It also reduces the risk of workers getting injuries from tripping, slipping or falling on site, and increases productivity, as the device quickly and effortlessly lifts and places the rolls of geo-fabric.

Wearable Technology

FK Gardner and Sons trialled a device which can help detect loss of concentration and awareness by analysing the wearer’s skin conductivity.

BIG RIVER

SCAFFOLDING SOLUTIONS

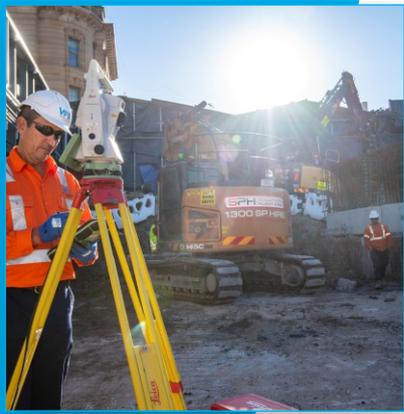
Family Owned - Servicing the Clarence Valley and Surrounds

SPECIALISING IN:

- ERECTION, DISMANTLE AND HIRE OF SCAFFOLD
- HIGHLY EXPERIENCED TEAM
- FULLY INSURED



Phone: 0432 473 633



VFT

VFT Engineering Surveyors

CIVIL SURVEYING | 3D LASER SCANNING | BIM

If your project demands **Quality, Efficiency &**
a **Team you can rely on!**

VFT Engineering Surveyors possess the surveying & scanning capabilities & specialist personnel to ensure your next project runs on time, on budget & to a quality you can depend on - long into the future!

Proudly Established in 2003 & operated nationally throughout Australia, VFT retains over 200 years of combined surveying experience & the staying power required to contribute to the successful delivery of any project. Showcasing a vast portfolio of works in the Tier 1 & 2 space on projects such as the Sydney Metro (CSM - Central Station), Pacific Complete, NorthConnex, Port Botany Expansion, Wyangala & Copeton Dam Upgrades & working beside Australia's leading constructors has provided VFT the knowledge and skills required to achieve top status in the surveying industry.

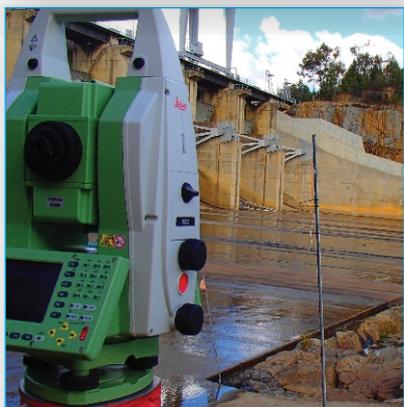
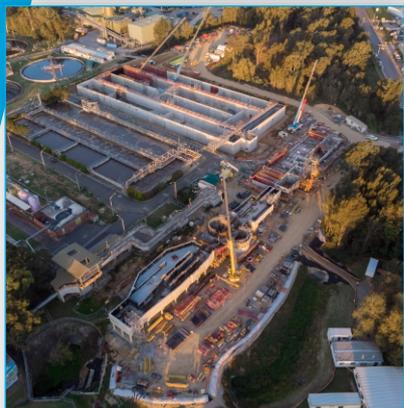
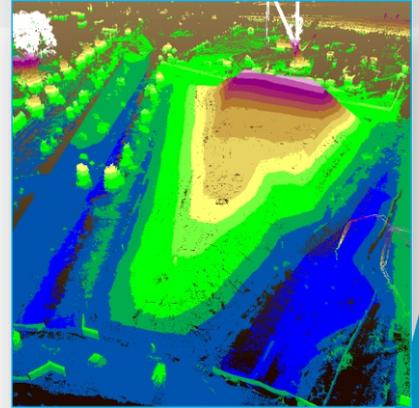
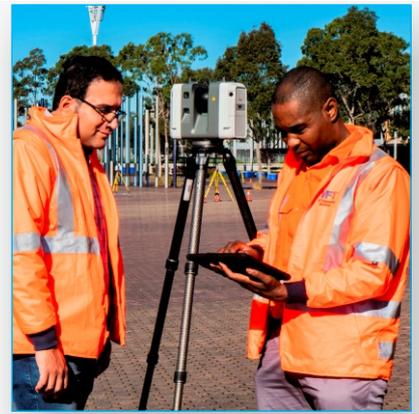
3D LASER SCANNING, REVIT & BIM

As early adopters in the 3D space VFT are now leading providers of 3D PointCloud, 3D CAD & Revit models, BIM integration, Dimension reports, Flythrough animations, coordination and clash detection and monitoring reports.

Using top of the line Leica survey grade terrestrial scanners and boasting our top tier digital engineering team whether your scope is construction, heritage, architecture, fabrication, industries and plant or film and lighting VFT capture and produce outstanding 3D information that easily integrates into your design and provides for your quality assurance requirements.

**CONTACT OUR TEAM ANYTIME TO SPEAK
ABOUT YOUR NEXT VENTURE:**

P: 0458 488 173
E: admin@vftes.com
W: www.vftes.com



The operators used it when working on plant known to escalate fatigue factors during operation, such as rollers. The feedback has been positive with the operators stating they are effective and comfortable to wear.

It is one of a number of wearable technology initiatives being trialled on Roads and Maritime projects.

Safety Across the Project

The Woolgoolga to Ballina project team focuses on creating a positive safety culture on the project, which encourages people to think about safety differently— safety is the presence of positives.

The project team aimed to inspire people to become part of the solution, by moving from a retributive culture to a learning culture—where continuous improvement is achieved through listening and learning from successes as well as mistakes.

The safety initiatives implemented across the project, under the banner of Next Gear, reflected the team's commitment to creating an environment where everyone goes home safe and healthy every day.

More than 5600 people have been inducted into the Next Gear program since early work started in mid 2015.

The project is building a workforce focusing on high consequence risks, simplifying systems and encouraging leadership and culture to challenge traditional thinking about safety.

Inductions were held at multiple locations along the alignment including Grafton, Tyndale, Iluka, Harwood and Pimlico.

A safety management system website developed by the project team provided contractors with a one-stop shop for all safety information for the upgrade.

The website provided an intuitive search capability and links to safety alerts and tool box talk libraries aimed at keeping contractors up to date with the latest safety information and helping build safety capabilities which can be implemented at future worksites.

It also provided easy access to all forms associated with the safety management system increasing efficiency and reducing red tape.

With 170 bridges requiring piling and the extensive length of the upgrade, the project team developed two fatal and severe risk management solutions (FSR) around piling operations and traffic management, in addition to a number of industry standards.

The Fatal and Severe Risk control document for piling is one outcome of a piling focus group established on the project in association with piling contractor experts Acciona Ferrovia Joint Venture, Advanced Foundation Solutions, Brady Marine, Davbridge Constructions and project team members.

It incorporated parts of the Victorian Industry Standard document provided by Piling and Foundation Specialists Federation.

A simplified 'focusing questions' document and revised Fatal & Severe Risk standard documents are accessible on the SMS page.

The Fatal and Severe Risk control document for traffic management aimed to eliminate or minimise the risks of fatalities, injuries and incidents arising from traffic operations around the projects worksites.

With more than 75 kilometres of the highway being built under traffic, the project team identified improved traffic management measures particularly around eliminating hazards in the first instance as a key focus for the upgrade.

This included using automatic or remote devices instead of traffic controllers where possible and seeking opportunities to remove the interface with live traffic through side tracks, safety barriers, road closures and/or detours, as part of 11 critical controls in addition to standard controls.

Implementing the new FSRs allowed the project to focus on the tasks and activities where serious harm could occur and to test, review and improve the controls in place. Risks continued to be identified across the project and ways to reduce harm were implemented through exploring the assumptions and learnings on which the project's practices and processes are based.



Trusted for reliable, professional and quality road sweeping services on the NSW North Coast

Our services include:

- Sweeping services for civil construction
- Road and car park construction, cleaning and maintaining
- Sweeping new seals, kerb and gutter
- Street sweeping
- Drain and pit cleaning and maintenance using suction wands
- Cleaning machinery - high pressure gerni
- Bridge cleaning

Preferred contractor for the Woolgoolga to Ballina Pacific Highway Upgrade.

Main Depot Located Midway Between Woolgoolga and Ballina.

Phone: 0448 452 241
www.northcoastroadsweepers.com.au



Geofab device



Soft soil treatment underway at Pimlico to Teven stage 3



Maclean to Devils Pulpit section - Laying geofab for new diversion roads

TRAFFIC MANAGEMENT

Roads and Maritime applied existing technology to construction sites on the Pacific Highway upgrade to increase safety, manage the traffic network more efficiently and improve road users' journey experience.

The Woolgoolga to Ballina Pacific Highway upgrade was used as a test for a number of these initiatives, with the view of potentially implementing them across NSW if successful. These include:

- Use of yellow line marking in work zones to improve motorists' guidance and awareness through the more complex work zones
- Electronic variable speed limit signs (VSLs) in work zones to improve motorists' travel experience through these work areas
- A dedicated traffic control centre for managing traffic/work zone delays and providing customers with up to date travel information
- Education programs for customers about road work sites.

In June 2017 the project was the first Pacific Highway upgrade to trial yellow lines, aimed at helping motorists more easily identify work zones. Yellow lines have replaced white lines on a 1.2 kilometre section of the upgrade south of the Harwood Bridge near Yamba.

Based on the success of the trial, yellow line marking has been also installed on about 2.3 kilometres of the highway at Chatsworth Island.

The yellow lines highlight the difference between driving along the existing Pacific Highway and driving through a work zone where changes including temporarily moving traffic to service roads, increased use of concrete barriers and reduced speed zones may be in place.

The trial was monitored with photos, dashcam footage and a survey to understand if the high visibility markings encourage motorists to slow down in work zones and therefore improve safety.



Yellow line trial south of Harwood



Cardno jointly delivered the **detailed design** of Portion C; 32km of the 155km stretch of the Woolgoolga to Ballina Pacific Highway upgrade.

Contact us for an experienced, tailored and practical solution to your next project.

- > **Engineering:** Road Design, Bridge Design and all associated Civil, Structural and Utility technical designs.
- > **Geotechnical:** Investigations, Interpretative reports and design.
- > **Planning:** including Transport and Traffic modelling.
- > **Sustainability**
- > **Surveying and Spatial**
- > **Aerial Data Acquisition**
- > **Environmental Services**
- > **Asset Management**

CONTACT

Allen Macourt
+61 2 9496 7810
www.cardno.com.au



The second of these initiatives was launched in mid September, 2017 when electronic variable speed limit signs started operating on a 3.5 kilometre section of the Pacific Highway south of Broadwater providing motorists with an improved driving experience through roadwork zones. The highway speed limit were reinstated out of construction work hours to provide more consistent and appropriate speed zones.

Previously, this has involved workers manually changing the signs under traffic control. The new trailer mounted variable speed limit signs improve worker safety by altering speed limits remotely.

This improved reliability and efficiency, which is key for our important freight and logistics industry and reduces frustration for other motorists.

Road users have also benefit from the reduced time it will take to lower or raise speed limits to match road conditions, when roadwork stops.



NSW Minister for Roads, Maritime and Freight Melinda Pavey, Member for Clarence Chris Gulaptis and Director Pacific Highway Project Office Bob Higgins at the launch of VSLs

Woolgoolga to Ballina project vehicles are restricted to 80 kilometres an hour or less on some local roads to help manage safety and dust. Monitoring systems have been fitted in vehicles, allowing them to be tracked for location and speed as they travel through local communities.

A number of roads were also built to enable the highway upgrade to be safely delivered while keeping traffic moving through the roadwork zones.

In September 2016, BMD Group was awarded the contract to deliver six temporary and permanent diversion roads next to the highway between Maclean and Devils Pulpit.

This key enabling work provided temporary lanes at Yamba, Harwood, Garrets Lane, Iluka, Chatsworth South and Chatsworth North.

SEE Civil Pty Ltd was awarded the contract to build a 3.5 kilometre service road next to the existing highway between Woodburn and Broadwater in February 2017.

Now completed, the service road has become a permanent local route giving motorists alternative access to the highway while connecting Woodburn and Broadwater through the Broadwater National Park. Work to build the service road was completed in early 2018.



Aerial view of Woodburn to Broadwater service road

ENVIRONMENT

The Woolgoolga to Ballina project team has been committed to minimising impact on sensitive environmental communities while building a safer Pacific Highway.

Mitigation measures that were implemented along the 155 kilometre upgrade are a result of Roads and Maritime's extensive experience in collaborating with multiple environment agencies to manage ecologically sensitive natural environments during major infrastructure projects.

The new highway route was designed to avoid the majority of habitat and thorough management plans for the 37 threatened species within the project alignment were developed to provide mitigation measures and a detailed monitoring program.

The Ballina Koala Plan and Koala Management Plan are part of these management strategies.



At **Danterr** we can see the big picture... we understand that Australia is thriving and as such our roads need to be up to the task of handling the tourism and commercial demands that are ever increasing in the Australian market.

To help in the upgrade of Australian roads, highways and bridges, **Danterr** supply the below unique product range.

- DIAMOND BLADES
- BITUTHENE® 5000
- DOWEL CRADLES
- DOWELS AND HEAT SHRINK SLEEVES
- BITUMINOUS CURING COMPOUND
- GROUT AFTEK PENATECH HB80
- ACTIVEECO CONCRETE WASH & BUFFER



The above is but a brief insight into Danterr's road upgrade capabilities. For our complete range please contact us:

Phone: 1800 262 383

Web: www.danterr.com | Email: sales@danterr.com

Australia wide - 24/7 we are here to help!

One of the specific goals outlined in the Koala Management Plan was to reduce koala deaths in the area by a target of between four and eight animals a year to slow the population's decline, with the aim of improving its overall viability.

The approval of the plans recognises the upgraded highway will provide numerous mitigation measures, which can contribute to the management of the remaining koala population in the area.

- Fully fencing along about 16 kilometres of the new highway between Richmond River and Coolgardie Road
- Installing 26 wildlife crossings between Richmond River and Coolgardie Road – which is about one crossing every 500 metres
- Fencing parts of the existing Pacific Highway and nearby local roads to further reduce mortality from road strikes
- Implementing a predator control program on local biodiversity offset properties, on Roads and Maritime Services and private properties
- Planting at least 130 hectares of new koala habitat in the area
- Introducing construction speed limits.



Crew installing wallaby proof fencing to protect koala revegetation

The project team met its commitment to plant more than 50 per cent of the koala food trees on previously cleared land before to ensure the trees are well established before project completion.

A total of 82 hectares, or 51,500 trees have been planted, 44.8 and 5.6 kilometres of temporary and permanent exclusion fencing respectively and 46 drop down structures have been installed. The fencing was a requirement of DP&E approval of the Koala Management Plan.



Wildlife ramp installed at Richmond River to Ballina Bypass section

A predator control plan targeting foxes, wild dogs and cats was carried out and includes working across 20 different landowner properties next to the highway route.

Koala detection dogs were used for pre clearing surveys from Broadwater to Coolgardie Road at Wardell. Highly specialised koala detection dogs and their handlers are a key strategy outlined in the Koala Management Plan to assist ecologists to protect koalas during the clearing process.



Jet the koala dog

CONNECTIVITY STRATEGY

Roads connect human communities and support the economic growth of NSW. However, roads and traffic also have the potential to impact wildlife connectivity by creating a barrier to movement and causing wildlife mortality. This can affect individual animals, populations and/or ecological communities.

The Woolgoolga to Ballina project team developed a fauna connectivity strategy to demonstrate how impacts from the project on the movement of key threatened animal species and other animal species will be mitigated and is part of the overall biodiversity mitigation framework.

The plan was approved by the NSW Department of Planning and Environment and the Australian Department of Environment and Energy. This approval was a critical step in ensuring project timelines were maintained for major building work and installing wildlife crossings.

There was ongoing consultation with government agencies and stakeholders throughout the project's development

powerclear

Phone: (07) 5568 0541

E: info@powerclear.com.au W: www.powerclear.com.au
 F: (07) 5568 0638 P: PO Box 2913 BURLEIGH QLD 4220

| | |
|--|------------------------------|
| ■ Large Scale Clearing and Grubbing | ■ Fauna Spotter |
| ■ Specialised Arborist Climbing Crews | ■ 24 Hour Emergency Response |
| ■ Municipal Arborist Crews | ■ Weed Surveys |
| ■ Consulting Arborists | ■ Herbicide Treatment |
| ■ Slashing, Mowing and Brush Cutting Crews | ■ Transplanting |

phase. Extensive ecological surveys and detailed design have helped inform the wildlife connectivity solutions adopted.

The final strategy was the result of nearly three years of work by the Roads and Maritime and Pacific Complete teams.

Key wildlife crossings, including bridges, culverts, fencing, widened median, and aerial crossings along this length of highway include:

- About 50 dedicated wildlife crossings
- About 70 combined wildlife crossings
- More than 270 incidental wildlife crossings along the 155 kilometre length between Woolgoolga and Ballina.

All of these measures are part of the Woolgoolga to Ballina project's commitment to the ongoing safe movement of local wildlife under or over the new highway now and in the future.

Key wildlife species which will benefit from this work include the Bush-tailed Phascogale, Long nosed Potoroo, Rufous Bettong, Spotted-tailed Quoll, Yellow-bellied Glider, Squirrel Glider, Koala, Large-eared Pied Bat, Little Bentwing Bat, Eastern Bentwing Bat, Large-footed Myotis, Coastal Emu, Green-thighed Frog, Wallum Sedge Frog and Oxleyan Pygmy Perch.

The Oxleyan Pygmy Perch (OPP) is a tiny endangered fish living under the new and old bridges at Tabbimoble Creek in the Maclean to Devils Pulpit section of the upgrade.

Efforts to stabilise the banks and creek bed which had been damaged by cattle use in OPP habitat were made possible because of a collaborative effort between Pacific Complete, Roads and Maritime, Environmental Protection Authority, Davbridge Pty Ltd and NSW Department of Primary Industry and Fisheries.

These tiny fish measure between 3.5 and 6 centimetres in size. The fish spawn between October and April when water temperatures exceed 20 degrees celsius in waterways of unique, lowland coast 'wallum' heaths.

This small fish is particularly sensitive to fluctuations in pH levels, so controlling water run-off from the working site into the nearby creeks is critically important.

A catch-net system developed works by retaining any spills and alkaline run-off from concrete work on bridges and created an irrigation system and dams to redirect discharge water away from the floodplain.

Success in protecting the OPP and its habitat on the Devils Pulpit upgrade provided a template for ongoing management of this threatened species on the Woolgoolga to Ballina project.

Work on the bridges in this section of the upgrade started early to help manage the OPP breeding season. The bridges are now complete.



Preparing for deck pours at Tabbimoble bridges

Management of the endangered Coastal Emu has also been a significant focus for the project team. During work on the Glenugie to Tyndale section of the Woolgoolga to Ballina project, known emu areas have been installed with temporary emu exclusion fencing.

Crossing zones were built to allow emus to cross the alignment and gain access to important habitats either side of the highway. The temporary fencing is used to develop an emu passageway or race to direct emus across the entire width of the construction corridor. The race is established perpendicular to the corridor. There are nine emu races established in key areas which are located at proposed bridge locations that will ultimately provide crossing points for emus.



Emu race established and maintained during construction at North Pillar Valley near Tucabia

At the start of each workday temporary gates at either side of the race were closed and then re-opened at the end of



Specialist in Steelfixing & Reinforcement
Want reo tied? Give Big Nuts a call!
Jye: 0499 306 621
Andrew: 0402 613 402
Email: info@bignutsreo.com.au

Proud to be associated with the Woolgoolga to Ballina project




- General Engineering
- Earthmoving Equipment Repairs
- Quarry & Mining Equipment Repairs
- ID Welding
- Mobile Line Boring
- Pile Welding & Cutting
- Shutdown Maintenance Solutions

Phone: 0429 236 306
www.scottsmobilewelding.com.au



E: scottsmobilewelding13@hotmail.com | Addr: 2B Cassino Drive Casino NSW 2470

each workday. These gates remain open during non-work days such as Sundays, wet days and public holidays. Roads and Maritime closely monitored the emu population using experienced ecologists and a range of techniques outlined in the Emu Management Plan.

The management of dust, water quality and noise are important considerations across the upgrade.

The project team used proven environmental management and mitigation methods to minimise these impacts during work. Some of the measures used to minimise dust and noise included

- Spraying water for dust suppression
- Applying dust binding agents to cover stock piles and mounds during construction
- Monitoring air quality and noise
- Positioning noise generating plant and equipment away from residential properties, where practicable
- Minimising the number of plant and equipment operating at the same time.



Water carts and earth work

SOFT SOIL TREATMENT AND EARLY WORK

Soft soils are an important design consideration for the project as there are deep soft soils in floodplain areas along the upgrade.

Treating soft soil before building the main alignment takes time but saves money. The aim was to consolidate the soil so it can be built on.

As it will take about two and a half years for the soil to consolidate once the water is removed soft soil treatments started early in the upgrade.

About 170 hectares of soft soil was treated along the 155 kilometre alignment with more ground monitoring instruments installed to gauge ground settlement.

Soft soil (wave 1) Farlows Lane to Chatsworth Road

Golding Contractors delivered about 37 hectares of soft soil work between Farlows Lane at Maclean and Iluka Road at Chatsworth.

More than 520,000 cubic metres of material was placed to help compact the soil at this location.

Soft soil (wave 2) Whytes Lane to Pimlico Road and soft soil (wave 4) work between Trustums Hill Road and Woodburn-Evans Head Road

See Civil Pty Ltd delivered 15 hectares of soft soil work between Coolgardie Road, Coolgardie and Ballina Bypass. More than 230,000 cubic metres of material was placed to help compact the soil at this location.

See Civil carried out about 21 hectares of soft soil treatment at Tuckombil Canal and areas directly north and south of the Woodburn.

More than 475,000 cubic metres of material was placed to help compact the soil at this location

Soft soil (wave 3) Tyndale to Maclean

FK Gardner Group carried out about 100 hectares of soft soil treatment across four soft soil sites at Champions Creek, Shark Creek, McIntyres Lane and Maclean interchange and early work activities on the Woolgoolga to Ballina upgrade between Tyndale and Maclean

More than 2.2 million cubic metres of material were placed to help compact the soil at this location.

New bridge over the Clarence River at Harwood

Acciona Ferrovial Joint Venture operating as Pacifico Harwood for the upgrade is carrying out about 1.9 hectares of soft soil work around the longest bridge of the upgrade.

About 130 thousand cubic metres of soft soil and earthwork was required for the bridge.

New bridge over the Richmond River at Broadwater

Lendlease Engineering Pty Ltd carried out about one hectare of soft soil work on the banks of the river as part of work for the second longest bridge of the upgrade.

About 25,000 cubic metres of soft soil and earthwork was required for the bridge.

Pimlico to Teven stage three

Georgiou Group Pty Ltd delivered five small sections of soft soil work in the 1.8 kilometre section being built as the final stage of the Ballina Bypass, between Pimlico and Teven. This work was located directly east of the sections previously opened to traffic in May 2016.

About 110,000 cubic metres of soft soil and earthwork was required at this location.






Specialising in

- Government infrastructure projects
- Residential subdivisions
- Drainage and underground services
- Wide range of different excavator sizes and attachments
- Highly adaptive to different environments and work applications
- Family owned and operated

Ph: 0400 034 479 / www.hammondearthmoving.com.au



Soft soil work looking south over new Yamba interchange



Soft soil work looking north over Serpentine Channel

Soft soil fast facts

- Moved and placed about 900,000 cubic metres of rock for under the embankments
- Installed more than 3000 kilometres of wick drains
- Installed and gathered information from more than 2,690 instruments which are monitoring ground settlement.
- 3.5 million cubic metres of earth for embankments moved and placed.

To help progress the upgrade as quickly as possible, early work contracts were awarded separate to the main civil work contracts.

This included contracts for the installation of environmental controls, dust gauges, water monitoring, nest boxes, soft soil monitoring, utility relocations, building removal, fencing, clearing and grubbing, survey work and the establishment of the main site compounds.

Early work included:

- Fill placement was completed at for soft soil sites located near Tyndale and Maclean and at the Mororo north embankment
- Foundation treatments was completed between Carrolls and Fischers Lane, at the Iluka and Harwood diversions and at the cut at Harwood north
- Completed earthwork, fill and stormwater work at Yamba diversion
- import of general fill for the Woodburn to Broadwater service road
- Clearing, fencing, and foundation work from the temporary site access south of Broadwater towards Broadwater - Evans Head Road
- Completed a temporary site access just north of Broadwater township

Early work on the new bridge over Richmond River at Broadwater included

- Completed geotechnical investigations on soft soils north of Broadwater
- Completed the intersection to the site compound off Pacific Highway, north of Broadwater
- Completed earthwork for parking heavy vehicles at the site compound
- Crane and piling pad earthwork and cane drain crossings



Early geotechnical work for the new bridge over Richmond River at Broadwater



Cane drains within the Richmond River construction area



Construction of access track into site compound for new Richmond River bridge



"Turning industry best solutions into world class outcomes."

Offering Australia wide service we can assist your project from inception to completion. Our wide and varied experience gives us the ability to provide a diversified yet specialised solution across your project.

| | |
|--|-----------------------------|
| ■ Civil, Mining, Marine Based projects | ■ Marine plant |
| ■ Plant hire | ■ Service trucks |
| ■ Crane hire | ■ EWPs |
| ■ Piling | ■ General and heavy haulage |
| ■ Bulk Haulage | |
| ■ Ancillary plant | |




Ph: 1800 489 538 | W: www.heavyliftsolution.com

MAIN CIVIL WORK

BGC Contracting was awarded the contract for main civil work between Tyndale and Maclean in July 2017. Work involves moving 650,000 cubic tonnes of earth, building 13 kilometres of two lane divided highway and 15 bridges.

CPB Contractors Pty Ltd was awarded the contract for main civil work between Devils Pulpit and Richmond River in August 2017

Work involved more than 2 million cubic metres of earthwork, some soft soil treatment north of Woodburn, six new bridges and refurbishment of the existing bridge, drainage, some road surfaces, two underpasses and four overpasses to provide access for local traffic.

Lendlease Pty Ltd was awarded the contract for main civil work between Richmond River and Ballina Bypass in August 2017.

Work involved about 1.7 million cubic metres of earthwork, building 17.5 kilometres of two lane divided highway between Richmond River at Broadwater and Pimlico Road at Pimlico, and includes the Whytes Lane overpass, earthworks and drainage.

Plant on site

- 96 pieces of large machinery on site between Glenugie and Maclean
- 65 pieces of large machinery on site between Maclean and Devils Pulpit
- 62 pieces of large machinery on site between Devils Pulpit and Richmond River
- 15 pieces of large machinery on site between Richmond River and Ballina Bypass
- 39 pieces of large machinery on site at the new bridge over the Clarence River at Harwood
- 6 pieces of large machinery on site at the new bridge over the Richmond River at Broadwater

Excavator hammering to remove rock in the cut between Tyndale and Maclean

BRIDGES

The Woolgoolga to Ballina Pacific Highway upgrade included 170 bridges including 57 twin bridges as part of the 155 kilometre upgrade. Major crossings were built over the Clarence and Richmond rivers as well as new or replacement bridges over existing creeks, underpasses and overpasses.

The bridge over the Clarence River at Harwood at about 1.5 kilometres, is the longest of the 170 bridges being built. The second major bridge of the upgrade, the bridge over the Richmond River at Broadwater will be about one kilometre long.

These two major bridges were delivered under design and build contracts by Acciona Ferrovial Joint Venture and Lendlease Engineering Pty Ltd, respectively.

As bridge building is a significant part of the upgrade, the majority are being delivered through seven specific contracts, which was identified as the best way to provide public value. Other bridges will be delivered as part of the main civil work packages.

A key outcome of the design refinement process was an increase in the number of bridges being built for the project from about 40 to 170, with many culverts being replaced with bridges.

The number and length of waterway openings increased to aid the flow of floodwater away from urban centres and agricultural land.

The new highway has delivered immediate benefits in terms of flood immunity. Historically, flooding in the Clarence and Richmond River flood plains is disruptive, often stopping traffic on the highway and requiring assistance for locals by emergency services. Some sections of the road currently have a one in five probability or 20 percent chance of flooding in any given year. The project is going to provide flood immunity in those areas at the level of between a 20 and 100 year ARI flood event.

Major Bridges

The bridge over the Clarence River at Harwood will be a 1.5 kilometre long, four lane divided bridge, about 20 metres east of the existing Harwood Bridge.

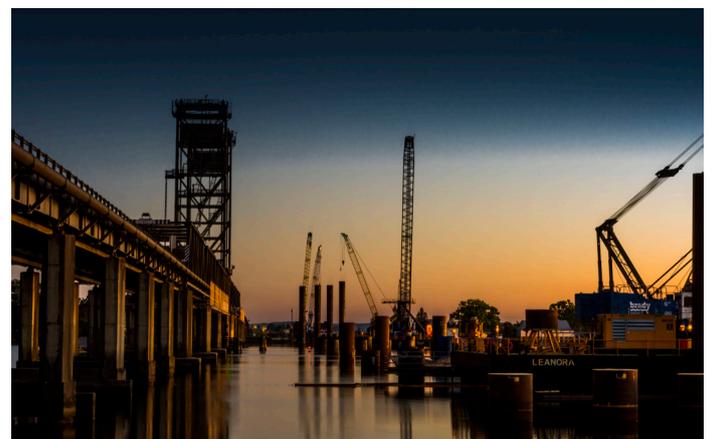
Over the river, there is a 30 metre navigational clearance in the centre of the bridge.

The new bridge has 36 spans supported by 35 piers - 13 in the Clarence River and 22 on land. The spans are made up of 144 concrete girders, weighing about 168 tonnes each.

The bridge over Richmond River at Broadwater is about 980 metres long and is an elevated structure about 6.5 metres at its lowest point and rising to about 13 metres at the point where it crosses the existing Pacific Highway.

Over the river, each navigational span is a minimum clearance of 35 metres wide and 15 metres high.

The new bridge has 26 spans supported by 25 piers, nine in the river and 16 on land, with a typical span length of about 38 metres with nine girders per span for a total of 234 Super T girders.



New bridge over the Clarence River at Harwood at dusk



Superior testing and analysis

Specialist hydrology & meteorology expertise & services

- Field sampling
- Training
- Environmental monitoring

Right Solutions - Right Partner E: hydrographics@alsglobal.com www.alsglobal.com



Artists impression of Richmond River Bridge



Girder install



Bridge building between Woolgoolga and Glenugie

Five barges were used to deliver the two longest bridges of the upgrade. The barges and the cranes they support helped to install bridge foundations, build bridge piers and install bridge superstructure segments such as girders.

The Rebecca Lily, Leonora and Aquila were based at the new bridge over the Clarence River at Harwood while two barges were used for the new bridge over the Richmond River at Broadwater.

'Rebecca Lily' is 55 metres long by 25 metre wide barge and was mobilised from Singapore in May 2017. The 300 tonne crane she carries assisted with marine piling. Leonora was the second barge to join the fleet in July 17

PILBARA TRUCK HIRE

- Bulk Haulage -Water & Fill Material
- Excavation & General Earthworks
- Water Cartage Specialists
- Dry & Wet Hire

PO Box 118, Toormina NSW 2450

Phone: 0402 549 447
PilbaraTruckHire.com.au

and was equipped to specialise in the excavation of the inside of the piles to allow for concrete reinforcement.

The 38 metre by 17 metre Aquila arrived from Brisbane in September 2017. The 180 tonne crane on board was used to excavate the pile casings..



Barge Leonara

BUILDING THE BRIDGES

Precast

Three companies were awarded contracts to supply the major precast concrete bridge elements for upgrade – and the quantities are enormous.

About 8500 elements were used to build bridges along the alignment. Using precast concrete components enabled faster, modular bridge building on site with most bridges able to be built about five to 15 percent faster than traditional cast in place building methods - helping to ensure the upgrade could open to traffic by 2020, weather permitting. These critical bridge precast elements are free issued to bridge contractors.

Lendlease Engineering Pty Ltd provided:

- 2276 winged planks
- 230 abutments
- 241 headstocks
- 234 super T girders for new bridge over Richmond River at Broadwater
- CPB Contractors Pty Limited provided 770 Super T girders

Humes Concrete provided 4734 parapets.

Pacifico Harwood provided 144 U-girders from their precast plant at Harwood.

Con-Tec, Brisbane provided 21 planks and 21 Super T girders for the Tabbimoble bridges.

These quantities were in addition to the 624 planks and 145 Super Ts already installed in the Woolgoolga to Glenugie section of the upgrade.

An important innovation developed through collaboration between Roads and Maritime Services and the Pacific Complete team was the design of a precast winged plank, which was used extensively on the project. About 2300 winged planks were used to build more than 100 bridges for the upgrade.

Richmond River Bridge

Safety in Design



Adopting Safety in Design principles is a critical aspect of managing risk and ultimately creating a safer workplace for construction projects. SMEC's design team worked closely with the construction team to optimise the design for the Richmond River Bridge, bringing safety to the forefront of design.

The Richmond River bridge project consists of a 980 m long dual carriageway bridge over the Richmond River and forms part of the Pacific Highway from Woolgoolga to Ballina in northern New South Wales.

The 26-span bridge used bespoke-designed precast pilecap shells, headstock shells and super-T girders with the edge upstand. The bridge was designed and subsequently detailed with the aim of improving safety and constructability.

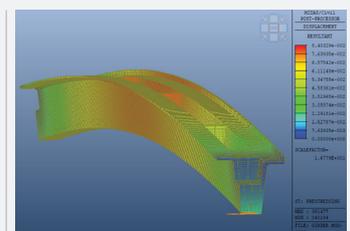
The use of these bespoke designed precast elements eliminated a number of risks and hazardous tasks, including:

- Diving work
- Reinforcement fixing at height
- Reinforcement fixing in water
- Temporary works installation
- Risk of trips at height.

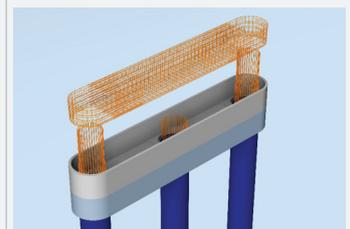
This success was founded on a robust Safety in Design process, encompassing constructability workshops, in-depth knowledge of fabrication and construction techniques, and advanced finite element analysis of the permanent works in transient design situations, including the key temporary works and their impacts.

The integration of 3D modelling into the design process enabled constructability validation in the early design stages. Best demonstrated with the detailed reinforcement modelling of pile cages and headstocks, which ensured that all components fit together on site.

The Richmond Bridge is now complete, forming a vital link in this section of the new Pacific Highway which is in the final stages of construction.



01 Finite Element Analysis of the Edge Super-T Girder with Hob



02 Precast Pilecap Shell – Lifting Study

The planks improved safety and saved money. Normal bridge planks have 30 centimetre gaps between them but the Woolgoolga to Ballina project team used a plank with a precast wing that spans the gap, eliminating the safety hazard and reducing the number of planks needed to build each bridge, saving resources and money.

The Warrell Creek to Nambucca Heads project was the first in Australia to use U-girder technology imported from Europe by the contractor for the bridges on the project.

The girders were made in a purpose-built, precast facility in Macksville and weighed around 153 tonnes each, measure 41 metres long and 2.2 metres high.

This U girder technology was used for the new bridge over the Clarence River at Harwood.

The U girders were cast on site at Harwood, limiting the need for extensive transport.



First headstock being placed for Tabbimoble bridge



Precast yard with five completed girders

Piling

Piling is an important part of the Woolgoolga to Ballina upgrade as it provides solid foundations for the 170 bridges, including 57 twin bridges being built across the 155 kilometre project.

About 1100 of the more than 1400 piles needed to build the remaining bridges were delivered through a site wide contract awarded to Advanced Foundation Solutions (Australia) Pty Ltd.

The award of the contract for piling involved engaging industry early in the process to help refine the final design and planning of the work which has helped achieve best value for money for the project.

The site wide piling contract created 90 jobs across the Woolgoolga to Ballina upgrade.



Piling operations on platform in Pillar Valley



Piling work progressing in Coldstream River



**Office: 07 3286 7321
info@besteel fixing.com.au**



Piling work in the Clarence River and at Yamba interchange

BRIDGE STATISTICS

- Acciona Ferrovial Joint venture have delivered the new bridge over the Clarence River at Harwood
- Lendlease Engineering Pty Ltd have delivered the new bridge over the Richmond River at Broadwater
- Seymour Whyte Constructions Pty Ltd have delivered 36 bridges at 20 locations between Glenugie and Tucabia, including 16 twin bridges, and four overpasses
- BMD Construction have delivered 17 bridges at 10 locations between Tucabia and Tyndale and over Shark Creek
- Davbridge Properties Pty Ltd have delivered the bridges over Tabbimoble Creek and Tabbimoble overflow
- Bielby Hull Albem joint venture have delivered 44 bridges at 31 locations between Maclean and Iluka Road and between Trustums Hill and Richmond River and the new bridge over the North Arm of the Clarence River at Mororo
- Quickway Constructions Pty Ltd have delivered 23 bridges at 14 locations between Richmond River at Ballina Bypass
- 15 bridges between Woolgoolga and Glenugie
- 71 bridges between Glenugie and Maclean – including 28 twin bridges and 13 overpasses
- 23 bridges between Maclean and Devils Pulpit – including one twin bridge and three overpasses
- 31 bridges between Devils Pulpit and Richmond River – including 12 twin bridges and four overpasses
- 24 bridges between Richmond River and Ballina Bypass – including 10 twin bridges and three overpasses
- Two bridges were built as part of Pimlico to Teven stage three.

Pacifico Harwood Bridge Project Subcontractors and Suppliers

- CDA Eastland Trade Supplies
- Geofabrics
- Foundation Specialists
- Ross Lifting
- Orara and Clarence Industries
- Environmental Analysis Laboratories
- Maccor
- Burchills
- Universal Cranes

- Cardno
- The Fleet Office
- Risk & Environmental Management Services
- NJ Construction
- Macro Surveyors
- Soil Conservation Service
- Essex Bulk Haulage
- Adiemas Services
- EnvironData
- Douglas Partners
- Clarence Richmond Concrete Pumping
- North Coast Road Sweepers
- RCPA
- Polyfabrics
- BCRC
- Quarry Solutions
- Hydraulink Maclean
- Soil Wicks
- Geolink
- Workforce Road Services
- ALE Heavylift
- Formcon
- West Tankers
- Envite Environment
- AOE Cranes
- Burnett Civil
- Humes
- Robar Civil
- Hayes Civil
- Ballina Scaffolding

EARTHWORK

Extensive earthwork has been carried out along the length of the upgrade to provide a strong foundation for the highway.

About 14.3 million cubic metres of earthwork was needed across the 155 kilometre upgrade with about 13.8 million cubic metres between Glenugie and Ballina.

Six contractors carried out earthwork construction across the project:

- **Seymour Whyte Constructions Pty Ltd** – Early work between Glenugie and Tyndale
- **FK Gardner & Sons** – Early work between Tyndale and Maclean
- **Golding Contractors** – Early work between Maclean and Iluka Road
- **BMD Constructions Pty Ltd** - Diversion roads between Maclean and Devils Pulpit
- **See Civil Pty Ltd** - Early work between Coolgardie Road and Ballina Bypass, early work between Trustums Hill and Broadwater National Park and the Woodburn to Broadwater Service Road
- **Georgiou Group Pty Ltd** - Pimlico to Teven stage three



- Formwork edgeboard system for culverts and concrete slabs
- All aluminium - fully reusable
- 50% of set up & stripping times
- Fast formwork in minutes



**FREIGHT AUSTRALIA WIDE
BASED IN SEQ**

Phone: 0423 866 234 | Email: shane@edgeproformwork.com.au

BMD Constructions W2B Diversion Lanes Subcontractors and Suppliers

| | |
|---|---------------------------------|
| Altus Traffic | Traffic Control |
| Australian Soil and Concrete Testing | NATA certified testing |
| Avante Linemarking | Linemarking |
| Beaumont Stabilising | Pavement Placement |
| Boral Asphalt | Asphalt |
| Border Construction | Minor Civil/ Plant Hire |
| BPE Contractors Pty Ltd | Plant Hire |
| C & K Shannon Earthmoving | Plant Hire |
| CCCG | Plant Hire |
| CJ Robinson Earthmoving | Plant Hire |
| Clarence Valley Tipper Hire | Plant Hire |
| Coffs City Cranes | Crane Hire |
| Coffs Coast Under Road Boring | Underboring |
| Colas (SRS Seal) | Spray Seal |
| Complete Labour Solutions | Labour Hire |
| Corbett Earthmoving | Plant Hire |
| DJC Backhoe Hire | Plant Hire |
| Down2Earth Earthworx and Tree Arborists | Tree Clearing |
| Duke Contracting | Plant Hire |
| Eastern Dorrigo Slashing | Plant Hire |
| EnvITE Environment | Ecological Restoration |
| EPH Queensland | Plant Hire |
| Ezyquip | Plant Hire |
| Franklin Plant Hire | Plant Hire |
| Geolink | Environmental Reporting |
| Georges Tree Services | Tree Clearing |
| GrowGrass | Spray Seed |
| Hammond Earthmoving | Plant Hire |
| Hard Rock Excavations | Drainage Installation |
| Haulage D&A Pty Ltd | Planthire |
| Houspect NSW | Delap Report |
| Jagcor Pty Ptd | Concrete FRP |
| Jim Anderson Earthmoving | Plant Hire |
| Landtrak | Truck Hire |
| Lets Be Civil Contracting | Plant Hire |
| MAAS Group | Plant Hire |
| McFadyen Group | Plant Hire |
| North Coast Contracting | General Minor Civil/ Plant Hire |
| North Coast Drilling & Wicks | Wicks |
| North Coast Road Sweepers | Plant Hire |
| North East Cranes | Crane Hire |
| Programmed Skilled | Labour Hire |
| Quirky Digger Hire Pty Ltd | Plant Hire |

| | |
|--|----------------|
| R & T Kenny PL | Plant Hire |
| RoadNet | Traffic Design |
| Ryno Fencing | Fencing |
| S B Grader Hire | Plant Hire |
| SOK Pty Ltd | Plant Hire |
| Southern Cross Demolition | Demolition |
| Southern Cross University | Soil Testing |
| State Road Constructions | Plant Hire |
| Stowe Australia P/L | Electrial |
| Survey 3D | Survey |
| Universal Cranes | Craneage |
| Valley Earthworks | Plant Hire |
| VE Group | Plant Hire |
| Wicks and Parker Cranes | Craneage |
| We Just Grind It Vegetation Management P/L | Tree Clearing |

The Woolgoolga to Ballina Pacific Highway upgrade used road building material from within the alignment of the new highway, from local quarries and from a number of borrow sites along the route.

The Woolgoolga to Ballina Pacific Highway upgrade aimed to reuse as much as possible of the excavated materials from along the alignment to reduce the costly collection of waste material and the delivery of extra earth materials.

Borrow sites were generally located close to the where the material is needed, reducing the number of trucks on the existing highway and travel distances, improving safety and efficiency for all road users.

A 30 kilometre haul road was also built for the Glenugie to Tyndale section of the project to limit the need for large earthwork equipment to use local roads.

There were a number of borrow sites along the length of the Woolgoolga to Ballina route.

- About 700,000 cubic meters of material was expected to be removed from the Lumleys Hill borrow site at Wardell.
- About 300,000 cubic metres of material was expected to be removed from the Gibson and Jali borrow sites at Bagotville.
- About 276,000 cubic metres of material was expected to be removed from the Jackos quarry site at Tyndale.
- Up to 300,000 cubic metres of material was expected to be removed from the Lang Hill site at Woodburn.
- About 800,000 cubic metres of material was expected to be removed from Moonimba Quarry at Bungawalbin.

Borrow sites have been rehabilitated after work was complete in line with the project's conditions of approval and the approved Borrow Site Management Plan.



**EXPERIENCED AND RELIABLE
CIVIC CONSTRUCTION SERVICE**

- Owner Operator for 24 years
- 26T Excavator with Full GPS
- Mud, GP Buckets & Ripper
- Scales ■ Tilt Hitch



Mobile: 0415 616949 E: Scott.quirk@hotmail.com

On the Woolgoolga to Ballina upgrade project, bulk earthwork involved either cutting into or excavating an area of ground or building a new area, such as an embankment by adding earth based materials. It also involved some drilling and blasting in selected areas where rock can't be excavated using other techniques.

Noise, dust, vibration and water quality was monitored throughout earthwork for the project and sites inspected regularly to ensure compliance required under the Environment Protection License for the upgrade.

Nine North Coast quarries were awarded contracts to supply road building material for the Woolgoolga to Ballina Pacific Highway upgrade.

| QUARRY | SUPPLY LOCATION |
|-------------------------|--|
| Champions Quarry 2 | Devils Pulpit to Richmond River and bridge over the Richmond River at Broadwater |
| Crush and Haul | Glenugie to Maclean |
| Holmes | Glenugie to Ballina bypass and bridge over the Richmond River at Broadwater |
| BD and MC Lewis | Maclean to Devils Pulpit and bridge over the Clarence River at Harwood |
| Newman Quarrying | Maclean to Ballina bypass and bridge over the Clarence River at Harwood |
| Quarry Solutions | Glenugie to Ballina bypass and bridges over the Clarence and Richmond rivers (from locally based quarries) |
| Thorley Sand and Gravel | Glenugie to Maclean |
| McLennan Earthmoving | Secondary supplier to Glenugie to Maclean – |
| Santin Quarry Products | Secondary supplier for Devils Pulpit to Ballina bypass |

INNOVATION

Augmented reality

The Woolgoolga to Ballina project team has implemented various Augmented Reality (AR) sites to better visualise and explain the highway upgrade to focus groups, stakeholders and the community. Due to limitations in the device GPS accuracy and file size, static views are usually pre-determined which limits the user experience and overall flexibility.

The Digital Engineering Survey and Site teams worked with specialist app developer Auggd, to produce a fully mobile augmented reality experience called 'AR Anywhere'. This enhanced version of the LORAR+ app connects to the project survey network to deliver accurate and rich visualisations to the users in the field from any viewpoint.

One of the benefits of the technology is that it empowers the project's engineers, providing a quick and accurate

method of interrogating information and communicating it clearly.

It has been used to identify buried services, for ground truthing designs with existing site conditions and communication with external project stakeholders.

When the accuracy allows it, traditional survey could be supported with pickup or set-out directly from the tablet. The development of this technology is an example of the learning and innovation being developed and implemented on the Woolgoolga to Ballina project with the support of all partners - Roads and Maritime Services, Laing O'Rourke and WSP.

The management of fatigue is an important consideration for the upgrade.

Tablets in the field

Android tablets were used in the field, allowing surveillance officers and engineers to stay in contact using emails and the project's correspondence and document control system.

This ensures the team had access to the latest design documents and can collaborate with other team members efficiently. Photos taken with the tablet are geo referenced, and uploaded to a cloud server, where they are later added to the Woolgoolga to Ballina GIS system, allowing them to be viewed by location, date and time of being taken.

Inspection checklists, daily diaries and other forms were completed electronically on the tablets and uploaded to the project's data warehouse. This allowed for monitoring and analysis of the data recorded, management of issues and identification of trends in real time.

Design documentation has a QR code embedded on it by the document control system, which allows for instant checks on the currency of hard or soft copy of the drawings. Most importantly, the tablets allow field staff to remain in the field and reduce the time spent in the office doing administration and filing.

EMPLOYMENT

About 2100 people worked on the Woolgoolga to Ballina section of the upgrade.

The multiple contracts for the upgrade were expected to create up to 2500 direct and 7500 indirect jobs at the peak of construction around mid 2018.

The final link in the Pacific Highway upgrade is providing unprecedented opportunities for local communities to benefit economically from the upgrade including demand for housing and local services and increased employment opportunities for workers.



Clarence Coast Scaffold Services

THE SAFE ACCESS EXPERTS

- Civil Infrastructure including Bridges, Ports, Roads, & Water Facilities
- Kwikstage, Tube+Clip, Temporary Fencing
- Mining & Gas Construction and Maintenance



www.clarencecoastscaff.com | Phone: 0421 466 146

The project also provided subcontracting and supply opportunities for local businesses and people and indirectly supporting the workforce in other industries including accommodation and hospitality.

The upgrade contributed to the long term upskilling of the workforce by working closely with NSW's north coast based training and employment providers to identify and prepare individuals and businesses for job opportunities. Contractors engaged by the project team have responsibility for sourcing employees to deliver the upgrade. The project team helped to facilitate this process through employment roadshows, organising site visits for construction industry students, participating in career open days held by training and education organisations and providing site inductions and Next Gear safety training.

The Woolgoolga to Ballina project is making a difference locally to young workers, inducting 70 apprentices and trainees across the alignment to date.

Workers who gain skills on the Woolgoolga to Ballina upgrade will have greater employment opportunities, developing expertise which can potentially be transferred to other industries.



Participant at a jobs roadshow



Our people

PIKE ENGINEERING PTY. LIMITED
 CONSTRUCTION ENGINEERING CONSULTANTS

**Construction Systems Designs
 for Technically Difficult
 and Heavy Civil
 Projects.**

Phone (02) 4227 6119
 Fax (02) 4226 9955
 E: bpike@pike-engineering.com.au
 PO BOX 362, FAIRY MEADOW NSW 2519

ABORIGINAL PARTICIPATION

The Pacific Highway upgrade program has always had a strong focus on increasing the direct employment of Aboriginal workers on construction sites. Aboriginal employment has steadily increased in recent years from an average of seven per cent in 2014 to an average of 12 per cent in 2016, with some individual projects recording peak employment rates of between 18 and 20 per cent.

In August, 2017 the Pacific Highway upgrade program had a 8.18 per cent Aboriginal participation rate with a participation rate of almost 11 cent for the Woolgoolga to Ballina section.

The Woolgoolga to Ballina project team is taking a number of steps to support the recruiting and retaining of Aboriginal employees including implementing the NSW Government's Aboriginal Participation in Construction policy which requires 1.5 per cent of the total estimated value of participating contracts to support Aboriginal participation. This applies to contracts awarded from July 2016 and includes the section of the Woolgoolga to Ballina upgrade between Glenugie and Ballina.

The Woolgoolga to Ballina Pacific Highway project team is implementing an Aboriginal participation plan to help to support Aboriginal business and local employment opportunities including requiring a 7.5 per cent Aboriginal participation rate on appropriate contracts.

The Woolgoolga to Ballina team awarded two contracts which included mandatory 7.5 percent Aboriginal participation. These are contracts with GMC for koala revegetation in the section between Richmond River and Ballina and CBC for operation and maintenance of site compounds along the entire corridor. All other contracts for the Woolgoolga to Ballina upgrade have a mandatory 1.5 per cent Aboriginal participation requirement and the project team will work with the successful businesses to ensure this commitment is met throughout the length of the project.

The project also had strict reporting criteria, which requires contractors to demonstrate they are meeting their obligations on Aboriginal participation.

Delivery partner Pacific Complete has employed an Aboriginal affairs coordinator whose role is to engage with local Aboriginal communities to encourage participation on the upgrade.

As part of the project's delivery, clear information on how to access employment and business opportunities is an important part of the project's Aboriginal Participation Strategy. The information is available on the Roads and Maritime Services Woolgoolga to Ballina project page and through regular roadshows which directly link contractors with jobseekers.

NviROSCOPE

- Rock Filled Gabions and Mattresses
- Stone Pitching
- Concreting
- Rockfall Protection Netting
- Erosion Control & Earth Stabilisation

www.nviroscope.com.au
 Email: admin@nviroscope.com.au
 Phone: (02) 6672 1166 | Mob: 0428 400 997 | Mob: 0427 736 230

SUPPORTING THE FUTURE

The project team was committed to supporting future roadbuilders with sponsorship of an engineering challenge involving more than 250 year 10 students from eight schools between Grafton and Woolgoolga. The event provided an opportunity for the wider Pacific Highway upgrade project team to encourage local children to consider future career paths.

Members of the team presented to the University of Newcastle on the importance of inspiring young people to consider a future career in science and engineering and supporting young engineers in their career development.

Team members also shared their bridge building expertise and participated in the judging panel at the bridge building challenge involving students working in teams to design and construct a model bridge in four hours - using materials such as balsa wood, thumb tacks and coffee stirrers.

Each bridge model was then tested for load bearing capacity by transporting weights in a trolley across the bridge deck. Points were awarded based on the weight of the bridge model and the number of weights it supported – the lighter the bridge model the more points students gained.

Woolgoolga to Ballina Ancillary Site Compound Subcontractors and Suppliers

| | |
|--------------------------|--------------------------|
| Ausco Modular Pty Ltd | Temporary Buildings |
| ACOR Consultants Pty Ltd | Civil design consultant |
| Ardent Group Pty Ltd | Environmental consultant |
| Geolink Pty Ltd | Environmental consultant |
| Spyve Survey Solutions | Survey |

| | |
|----------------------------|-----------------------------------|
| Geofabrics Australasia P/L | Geotextile supplier |
| Newman Quarrying Pty Ltd | Quarry products |
| Quarry Solutions Pty Ltd | Quarry products |
| McLennan Earthmoving | Quarry products |
| Boral Concrete & Quarries | Concrete supply & quarry products |
| NSW Spray Seal Pty Ltd | Bitumen spray seal contractor |
| Cambuild Constructions P/L | Concreting contractor |
| Origin Fencing Pty Ltd | Fencing contractor |
| Valley Earthworks Pty Ltd | Plant hire |
| Corbetts Earthmoving | Plant hire |



Site compound establishment Pimlico



CLEAN WORKS NORTH COAST PTY LTD

- Servicing Sunshine Coast to Coffs Harbour
- Civil, Commercial, Industrial & Retail Cleaning Professionals
- Specialist Cleaning including Hard Floors, Maintenance, Carpets, Pressure Cleaning & Waste Removal
- Consumable supply & delivery
- 20 Years Experience

PH: (02) 6683 2670
Mobile: 0404 863 808 | 0408 878 991



SITE COMPOUNDS

Main site compounds (also known as ancillary sites) were established at eight locations between Glenugie and Ballina Bypass to provide temporary office, workshop and storage facilities for construction teams working on the upgrade.

Shamrock Civil Engineering Pty Ltd won the contract to design and construct six main compound sites along the 155 kilometre route in October 2016.

Compounds were established at:

- Avenue Road Glenugie, Tyndale & McIntyres Lane Gulmarrad, between Glenugie and Maclean
- Iluka between Maclean and Devils Pulpit
- Broadwater between Devils Pulpit and Richmond River
- McAndrews Lane between Richmond River and Ballina Bypass

These compound sites had desk space for between 55 and 150 people, extensive heavy and light vehicle parking and geotechnical and laboratory facilities at Avenue Road, Iluka, Broadwater and McAndrews Lane.

Smaller compounds, known as satellite compounds, were also set up as needed by contractors on site to locate staff and facilities close to work areas. Once the upgrade is completed compounds will be removed and sites restored to their previous landscapes.

PROJECT UPDATE

New motorway between Glenugie and Tyndale

The 36 kilometre section of new motorway between Glenugie and Tyndale will shortly open to traffic, weather permitting. As part of these changes South Grafton and Ulmarra will be bypassed.

This new section will feature the opening of two interchanges, new north and southbound rest areas at Pine Brush and several overpass bridges connecting local communities. The bypassed section of highway between Glenugie and Maclean will be renamed Big River Way*.

Big River Way will continue to connect communities across the region once this section of the Woolgoolga to Ballina upgrade opens to traffic.

The Tyndale south interchange and the split interchange

at Glenugie will open in their permanent arrangement as part of this traffic change. This will join the recently opened section between Tyndale and Maclean. These two sections combined will provide 48 kilometres of dual carriageway.

Accessing the new motorway

Once the interchanges open to traffic, motorists will access and exit the motorway at a number of new locations.

Glenugie south interchange

This interchange has a northbound off ramp and a southbound on ramp. Access to Grafton for northbound motorists will be via the northbound off ramp at Glenugie. Motorists will then continue on Big River Way* to South Grafton. Motorists travelling south from Grafton on Big River Way* access the highway by using the southbound on ramp at Glenugie.

Glenugie north interchange at Eight Mile Lane

This interchange has a northbound on ramp and a southbound off ramp from Eight Mile Lane. To travel north to Tyndale from Glenugie, Woolli and surrounding areas, motorists will use the northbound on ramp. Access to Glenugie, Woolli and surrounding areas for southbound motorists will be via the southbound off ramp.

Tyndale south interchange at Bensons Lane

This interchange has a northbound off ramp and a southbound on ramp. Access to Tyndale for northbound motorists will be via the northbound off ramp. To travel south from Tyndale, motorists will use the southbound on ramp. View the inset map to familiarise yourself with the new permanent access points.

MAJOR PROJECT SPECIALIST

CELEBRATING 50 YEARS

NEWCASTLE HI-TENSILE BOLT Co.



NHTB
NEWCASTLE HI-TENSILE BOLT Co.

SPECIALISTS
in the supply of ...

- Construction Fasteners
- Chemical Anchors
- Foundation Bolts
- Structural Assemblies

3 Gipps Street
Carrington
NSW 2294
02 4968 9101
sales@nhtb.com.au
www.nhtb.com.au



Specialists in
contaminated land
management
Ph: (02) 6685 7811
W: www.cavvanba.com
E: inbox@cavvanba.com



CONCRETE GRINDING TEXTURING & REPAIRS

Ph/Fax: (02) 4362 2466 - Mobile: 0418 649 277

Adam Rodgers
Mechanical Engineer
31 Chittaway Road
Ourimbah NSW 2258
ABN: 89 726 694 754

COMPANIES THAT HAVE BEEN ENGAGED BY PACIFIC COMPLETE

| | |
|---|---|
| Acciona Ferrovial Harwood Joint Venture | Harwood Bridge D&C |
| Davbridge Properties P/L | Tabbimoble Bridges |
| Lendlease Engineering P/L | Design and Construction of Bridge over Richmond River at Broadwater |
| Lendlease Engineering P/L | Richmond River Bridge Design and Construct |
| Lendlease Engineering P/L | Precast Bridge Component Supply-Planks, Headstocks & Abutments Site Wide |
| Bielby Hull Albem Joint Venture | Trustums Hill to Richmond River Bridge Structures |
| Seymour Whyte Constructions Pty Ltd | Glenugie to Tyndale - Bridge Structures (South) - Six Mile Lane to North of Chaffin Creek |
| BMD Construction | Glenugie to Tyndale Bridge Structures - North and Shark Creek |
| Bielby Hull Albem Joint Venture | Bridge Structures Maclean to Iluka Road |
| CPB Contractors Pty Ltd | Precast Bridge Component Supply-Super T Girders |
| Holcim (Australia) Pty Ltd | Precast Bridge Elements |
| Arup Cardno Joint Venture | Detailed Design |
| Shamrock Civil Engineering Pty Ltd | Site Compounds D&C |
| BMD Constructions Pty Ltd | Temporary and Permanent Diversion Lanes |
| GeoLINK Consulting P/L | Surface and Groundwater Monitoring |
| SEE Civil Pty Ltd | Construction of Woodburn to Broadwater Service Road |
| Georgiou Group Pty Ltd | Pimlico to Teven Stage 3 |
| BGC Contracting | Tyndale to Maclean Main Civil Works |
| Seymour Whyte | Glenugie to Tyndale Main Civil Works |
| CBC Facilities Maintenance Pty Ltd | Site Compound Maintenance |
| CPB Contractors Pty Ltd | Devils Pulpit to Richmond River Main Civil Works |
| Lendlease Engineering P/L | Richmond River to Ballina Bypass Main Civil Works |
| Cardno Construction Sciences Pty Ltd | Construction Laboratory Testing Services |
| Coffey Geotechnics P/L | Geotechnical Investigation, Surface and Groundwater |
| Golder Associates Pty Ltd | Geotechnical Investigation Surface and Groundwater |
| Ecosure Pty Ltd | Threatened Species Management |

| | |
|---|---|
| SEE Civil Pty Ltd | Early Works |
| FK Gardner & Sons | Early Works |
| Instruments Downunder | Geotechnical Instrumentation Installation Surveillance |
| Eco Logical Australia P/L | Nest Boxes |
| Seymour Whyte Constructions Pty Ltd | Early Works |
| Douglas Partners | Geotechnical Investigation |
| Ecowise Australia Pty Ltd | Site Wide |
| N.J. Construction Pty Limited | Utility Diversion – Power (Construct) |
| East Coast Building Consultants Pty Ltd | Building Condition Surveys |
| Pitt & Sherry (Operations) Pty Ltd | Dilapidation Surveyor - Bridge/Roads |
| Gosling Electrical | Power Distribution Network Relocations |
| GeoLINK | Consistency Assessments |
| Colemans Group (Aust) | Koala Fencing |
| Cavanba Consulting P/L | Contaminated Site Auditor |
| Envirodata Weather Stations Pty Ltd | Weather Stations Installation, Maintenance & Monitoring |
| AECOM | Soft Soil Design |
| SMEC Australia Pty Ltd | Detailed Design |
| SMEC Australia Pty Ltd | Intersection Upgrade Design PK02 |
| J. Wyndham Prince Pty Ltd | Intersection Upgrade Design PK03 |
| SMEC Australia Pty Ltd | Geotechnical Instrument Reading |
| Quarry Solutions | Quarry Products Supply |
| MI Engineers | Bill Of Quantities |
| GMC Environmental Consulting | Koala Tree Revegetation / Landscaping |
| BKM & Son Contracting | Concrete Agitator / Tipper & Water Truck Hire |
| Mobile Conveying Services Pty Ltd | Mobile & Portable Transfer Equipment |
| Fosroc Construction Solutions | Construction Products |
| Danterr | Construction Products |
| Impact Drill & Blast | Blasting Contractors |
| Scotts Mobile Welding & Maintenance | General Engineering |
| Clean Works North Coast Pty Ltd | Cleaning Contractors |
| Edgepro Formwork Solutions | Formwork Systems |
| Clarence Coast Scaffold Services | Access Equipment |
| Pilbara Truck Hire | Haulage |
| Heavylift Solutions | Plant Hire/ Haulage |
| Big Nuts Reinforcement Pty Ltd | Reinforcing |

Pacific Highway Upgrade Sees the Emergence of Lifesaving Fleet Technology



Roadworks were well underway on the Woodburne to Coraki Road section of the \$4.3b Woolgoola to Ballina Pacific Highway upgrade when community concerns were raised about safety issues relating to construction vehicles using the same 100kph road zone as local school buses.

The project's major contractor, SEE Civil engaged their vehicle and equipment telemetry provider **The Fleet Office** to develop a solution that would prevent the risk of injury or death, and allay the community's concerns about the safety of the school buses that used the same stretch of road.

Jim Lee, founder and managing director of **The Fleet Office** said his team was given a brief to create new software and devices and have them tested and successfully installed within 25 days.

The Fleet Office team created **The Truck and Bus Avoidance System (TBAS)** which tracked the location and speed of both the school buses and trucks regardless of the direction it was travelling.

An audible alarm could also be triggered in the truck when it approached a bus travelling in the same direction that was within 500 metres, while different audible alarm was triggered in the truck when it approached a bus travelling in the opposite direction that was within 800 metres.

Another feature prevented a truck from overtaking or being within 50 metres of the bus without an alert being triggered so when the truck stopped, so did other traffic and this provided even further safety for the local community.

Mr Lee said TBAS was installed in each of the SEE Civil subcontractor's truck fleet and was a resounding success with zero accidents and zero near misses recorded when the project concluded.

What was originally set out to overcome the safety hazard on the Pacific Highway Upgrade was now being deployed in other scenarios whereby Telemetry could be utilized to prevent collisions.

The Truck and Bus Avoidance System (TBAS) evolved into Ultrashield, a solution that could be used across other at risk mobile assets and mobile workers.

Queensland based earthmoving, bulk haulage and quarry materials specialists, VE Group have also engaged The Fleet Office's next-generation version of the TBAS software, Ultrashield at Anglo American's Dawson mine site in Moura.



Ultrashield provides additional safety to prevent near misses and incidents for mine and construction workers while on foot, operating machinery or driving.

Every worker and machinery operator are provided with their safety alert radius and 360-degree, bird's-eye view while on site.

VE Group Director Nathan Howell said Ultrashield provided additional safety onsite with the coverage to see every piece of plant on the screen including blind spots and other impediments.

"You physically get to see the equipment before it comes into the view of the operator. By embracing Ultrashield technology in all worksite safety procedures it will improve risk management unlike anything the industry has seen before," Nathan said

**For more information, please visit
www.thefleetoffice.com.au
or call our friendly team on
1300 110 248**

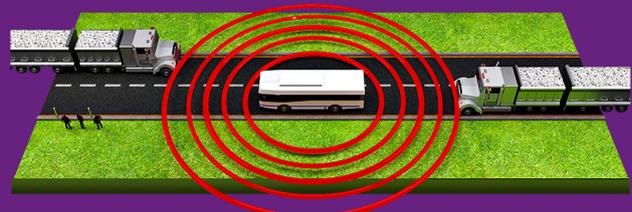
Problem:

No warning of vulnerable hazard ahead for example a school bus stopping to allow children to exit or if the bus is approaching head on.



Solution:

A notifications is sent to the truck driver, to reduce speed, be alert and maintain a minimum of 50m separation distance (distance can be configured).



YOUR FLEET TECHNOLOGY PARTNER



Stay Safe and Stay Compliant

In-Vehicle Monitoring System (IVMS) from The Fleet Office

- ✓ Lowest cost IVMS solution on the market
- ✓ Successfully used across all assets on Pacific Highway Upgrade Project
- ✓ Project friendly with 'no lock in contract'
- ✓ Configurable over the air for IVMS or bespoke specifications
- ✓ Secure Australian owned & hosted solution
- ✓ Designed for Cars, 4x4's, Utility Vehicles, Vans & Trucks
- ✓ Fully integrated with The Fleet Offices suite of Fleet & Workforce Management applications



Fleet Tracking
& Telematics



Electronic
Pre-starts



Integrated Service
& Maintenance



Digital
Timesheets



Fuel Spend
Analysis



Digital Forms



Online Induction
Platform



Asset Hire
ERP



Intelligent Collision
Prevention



Real Time
Asset Management

Built to Last: Fosroc's Leading Repair Materials and Protective Systems at Work



Now nearing completion, the Woolgoolga to Ballina road project is the final link in the Pacific Highway's upgrade to a four lane, arterial standard, divided dual carriageway.

One of the biggest infrastructure upgrades NSW has ever seen, Fosroc has been proud to contribute to the success of this project.

With nine interchanges, more than 170 bridges and more than 350 connectivity structures, the project aims to significantly reduce travel time while also greatly improving safety for the millions of Australians who use this major road. As a result, the use of superior quality construction products was paramount.

High performing products for a landmark project

Fosroc has been involved in the project from the outset, providing high performing products and construction solutions to ensure the longevity of the Pacific Highway for generations to come.

"Fosroc is the preferred supplier of mortars and curing compounds, joint sealants and grouts for many of the project's contractors and sub-contractors, and we are always determined to reward that trust with excellent service," explains National Specification Manager – Repairs & Grouts, Hamid Khan.



Achieving longevity with Fosroc repair mortars

"For this project, our market leading Renderoc repair mortars were chosen for their long-term dimensional stability and low permeability," says Hamid.

Renderoc HB40 and Renderoc HB70 Plus were used for vertical and overhead patch repairs, along with Renderoc LA55 Plus micro-concrete for deep section repairs.

Renderoc repair mortars are available in a wide range of strengths, for a range of application methods. They are shrinkage compensated to ensure long-term dimensional stability and offer excellent resistance to water, carbon dioxide and chlorides.

The use of curing compounds is recommended to help ensure effective curing and thereby maximise strength development.

"On this project, Fosroc Concure A99 curing compound was chosen for its water retention efficiency and rapid film formation."

Grouts for diverse applications

With a comprehensive range of grouts for most repair types and application methods, several Fosroc grouts were chosen for the Woolgoolga to Ballina road project. These included:

- Fosroc Nitofill LV – a low viscosity epoxy crack injection grout
- Conbextra C – a general purpose shrinkage compensated cementitious grout
- Renderoc BB – a high strength, low shrinkage cementitious mortar used for the installation of elastomeric bridge bearings

Long term asset protection

For long-term protection of the project, Nitocote EP410 was selected. This highly chemical resistant, solvent free, epoxy coating system was used on vertical surfaces and chosen for its outstanding anti-carbonation and chloride ion ingress properties.

Why Fosroc?

Fosroc is an international leader in delivering construction solutions for virtually any building or infrastructure project. New or old construction, above or below ground, at Fosroc we combine high quality products, expert technical support, customer service and innovation to deliver the best solution on every project.

At Fosroc, we believe that concrete should be built to last. Our high quality protective systems and repair materials can significantly prolong the life of a structure beyond its original design life. We specialise in tailoring product recommendations to meet our clients' usability and technical needs, relying on our unrivalled range of repair, strengthening and protection systems. We also supply products to meet specific requirements or standards, such as RMS B80.

Parchem Construction Supplies, part of DuluxGroup, is the licensed manufacturer and distributor of Fosroc, Vector®, Vandex®, and EdenCrete® products in Australia, and Concrete Plus™ is the licensed distributor in New Zealand. Fosroc is proud to be a gold member of the Concrete Institute of Australia.

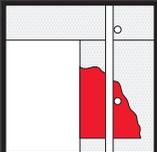
To find out more about Fosroc's construction solutions please visit our website or give us a call:

AU: 1800 812 864 | www.fosroc.com.au

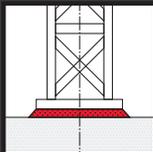
NZ: 0800 657 156 | www.fosroc.co.nz

FOSROC. FUTURE PROOF.

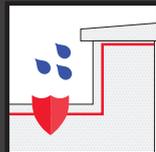
At Fosroc, we know great construction demands solid foundations. We deliver tailored, functional construction solutions - both above and below ground. Talk to us to future-proof your buildings and infrastructure.



Concrete Repair



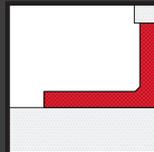
Grouts



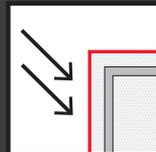
Waterproofing



Joint Fillers & Sealants



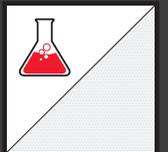
Industrial Flooring



Protective Coatings



Surface Treatments



Concrete Admixtures & Grinding Aids



constructive solutions

AU 1800 812 864 fosroc.com.au

NZ 0800 657 156 fosroc.co.nz

*Fosroc and the Fosroc logo are trade marks of Fosroc International Limited, used under license.



Impact Drill & Blast was selected to provide drilling and blasting services on the Pacific Highway upgrade between Woolgoolga and Ballina (W2B).

With more than 30 years' experience working on drilling and blasting projects across quarry, mining and construction industries, the **Impact Drill & Blast** team are known as industry leaders in blast management, blast design and shot firing.

Impact Drill & Blast National Operations Manager Rob Payne said that controlled blasting activities were managed by their expertly trained blast specialists, to quarry rock for the highway construction and blast cuttings in the road corridor as a safe and precise method for loosening hard rock.

"The environmental parameters for blasting (noise and vibration) were tight due to the close proximity of houses and the old Pacific Highway to the road corridor, so it was important to design the drill patterns and blasting to keep them to a minimum," Rob said.

Having worked on large-scale road projects in NSW and QLD, the **Impact Drill & Blast** team are well equipped to manage the unique environmental complexities of the Woolgoolga to Ballina upgrade.

"Aside from managing the environmental considerations when using explosives and blasting, there are also the safety factors. Typically a blast involves coordinating traffic control, police and road closures in order to have everything safe and secure before firing," he said.

"Safety underpins everything that we do, and I am proud to say that we did not have any reported injuries or environmental exceedances during our drilling and blasting activities. We met all of the safety and environmental requirements for the project which is a great result for the local communities." said Rob.

The blasting activities also provided reusable material for road and drainage construction. This required the fragmentation to be controlled through correct selection of explosives and developing a suitable timing plan for the non-electric detonators being used in the shot." Rob said.

Recently, **Impact Drill & Blast** have moved to introduce more technology to their drilling and blasting.

Impact have taken delivery of their first state of the art Sandvik GPS guided drill rig. Coupled with the drones used for 3-D survey of the blast area there is no need to paint "dots on the ground" for the driller. These technologies have sped up the drilling process and improved safety on the bench.

Rob said "Impact have also formed a strategic partnership with electronic detonator manufacturer Davey Bickford. Electronic detonators provide better safety, security, and accuracy. The increased accuracy of timing is a major benefit when the environmental parameters require low vibration and noise."



"We have committed to 100% use of electronic detonators by the year end. Our customers are benefitting from the introduction of electronic detonators, use of drones and GPS drills. The technology is providing higher efficiency in the drill and blast process, improving customer productivity and reducing their downstream costs."

"I am lucky to manage a great group of highly skilled people, who really excel at their role. By using technology, we can survey, design and drill environmentally sensitive blasts safely and efficiently," he said

**For More Information Contact
Impact Drill & Blast
Ph: 1800 2 IMPACT
www.impactdrillblast.com**



IMPACT
DRILL & BLAST



Mining, quarrying &
construction projects done
safely and cost-effectively

with our integrated drill & blast services

COMMERCIAL EXPLOSIVES

Commercial explosives for the mining, quarrying and construction industries - no matter the size or location of your project.

DRILL & BLAST

Integrated, safe, tailored drill & blast solutions to optimise outcomes in quarrying, mining and construction projects around Australia.

BLAST HOLE DRILLING

We own and operate drilling rigs across all areas of Australia. These are fully maintained and serviced to minimise downtime.

Partner with us if you're a quarrying, mining or construction company requiring professional, safe, cost effective, and prompt delivery on projects.

Drilling & blasting solutions you can trust...

The days of having to deal with multiple contacts from different companies for drill & blast services are over. Impact Drill & Blast provides fully integrated services that are:



FLEXIBLE

Drill and blast requirements for projects large and small anywhere in Australia



PROFESSIONAL

Trust in their reliability, safety and care for the environment



COST EFFECTIVE

Electronic Detonators introduce savings to your Project Budget

Hydro Digga



Family owned and operated, you can rely on **Hydro Digga** to get your project completed on time, according to budget and to your highest expectations of quality workmanship!

Hydro Digga is a team of highly skilled and experienced vacuum excavation, drain cleaning, CCTV Pipeline Inspection, Pipe repair, and underground service location operators ready to take on any industrial & commercial job in Australia regardless of size or difficulty.

At **Hydro Digga**, we always strive to exceed the highest expectations of service, workmanship overall results.



Hydro Digga's Business is our clients business with care and attention taken to focus on clients specific needs

Since inception **Hydro Digga** has been involved in Railway, Local Road, highway civil projects, road authorities, building contractors projects – There is no job to big or to small or to difficult.

Hydro Digga has provided services with high security clearance on significant construction sites, at many locations throughout Australia.

Hydro Digga Specialise in

- Electronic Service Locations with EMI and GPR
- Telstra APL (Accredited Plant Locator)
- Telstra OFL (Optic Fibre Locator)
- Optus Accredited/Certified Locator
- DBYD (Dial Before You Dig) Certified Locator
- Nulca Australia Inc Member (National Utility Locating Contractors Association)
- Vacuum Excavation
- Potholing Services
- Non-Destructive Digging
- Vacuum Excavation from a distance or in limited access situations
- Drain cleaning with continuous water recycling
- Drain Cleaning with Root cutting
- High pressure pavement cleaning
- Debris removal from SO drains
- CCTV pipeline inspections with laser defect measurement
- Pipeline repairs and robotics
- Environmental remediation works
- Hydro Sand Blasting

Whether it be large drain cleaning jobs , to all types of non-destructive digging & limited access excavation, we've got you covered.



**For More Information, Contact
Hydro Digga on 0447 774 000
or visit www.hydrodigga.com**



Hydro Digga

When Performance Matters

ACCREDITED SERVICE LOCATOR

- Certified Advanced Locators
- Certified Telstra APL (Accredited Plant Locator)
- Certified Telstra OFL (Optic Fibre Locator)
- Certified Optus Locator
- Certified DBYD (Dial Before Your Dig) Locator
- Certified Nextgen Locator
- NULCA (National Utility Locating Contractors Association) Member

VACUUM EXCAVATION

Vacuum Excavation by Hydro Digga involves using a jet of high pressure water to break up soil, which is then picked up through a vacuum hose. Vacuum excavation technology provides low-impact, noninvasive excavation.

All operators are fully trained in safe and environmentally friendly operation of our Vacuum Excavation equipment, and all other aspects of our profession.

DRAIN CLEANING

Hydro Digga drain cleaners use continuous Water Recycling. Water Recycling converts non productive filling time into cleaning time.

CCTV INSPECTION UNITS

Hydro Digga's CCTV Inspection units are able to provide our clients with certainty in relation to the measurements of any defects identified during the CCTV pipeline inspection. Hydro Digga CCTV units inspect pipelines from 100mm in diameter to 1800mm diameter pipelines.

PIPE REPAIRS AND ROBOTICS

Pipe localised patching, robotics and repairs.



DIAL BEFORE YOU DIG®
CERTIFIED
LOCATOR

0447 774 000
www.hydrodigga.com

W2B See Civil



The Woolgoolga to Ballina Pacific Highway upgrade involves the duplication of 155 kilometres to a four-lane divided road. The upgrade starts about six kilometres north of Woolgoolga (north of Coffs Harbour) and ends about six kilometres south of Ballina.

The Section 5 Foamed Bitumen package involved the provision and placing of foamed bitumen pavement on the northbound and southbound carriageway of the Pacific Highway between the new Maclean interchange and the Iluka Interchange.

SEE Civil worked collaboratively with Roads and Maritime Services and Pacific Complete to deliver this part of the Woolgoolga to Ballina Pacific Highway upgrade.

SCOPE OF WORKS

- Paver placement of around 160,000 tonnes of foamed bitumen stabilised material.
- Included all placing, spreading, compacting, trimming and curing of the stabilised materials
- Overall manufacture, supply and placement of 16 kilometres of foamed bitumen material
- Compliance and conformance testing and monitoring
- Hauling of mixed product to site
- Self-performance of all paving operations including significant survey inp



From General Earthworks to drainage to GPS and Final Trim experience, we can cover your earthmoving needs and requirements.

Australia Wide
Ph: 0434 011 570
www.SRBExcavations.com.au





Section 5 Earthworks

The Section 5 earthworks package involved work to construct the northbound and southbound carriageways as well as interchange ramps and local roads, north of the Harwood Bridge.

SCOPE OF WORKS

- Completion of around 50,000 cubic metres of earthworks across both carriageways and local roads and interchange ramps.
- Placement of 40,000 cubic metres of select and verge materials
- Removal of surcharge materials at the appropriate point through liaison with the project client and neighbouring contractors.
- Significant liaison with neighbouring contractors to ensuring works could be managed collaboratively and efficiently
- Facilitating the switching of traffic onto the completed Hardwood Bridge, a major milestone for the overall Section 5 works
- Removal of redundant pavements once traffic changes have been made

EAL Environmental Analysis Laboratory

Specialising in fast, high quality analytical services

Analytical testing of:

- R178 soil, compost & water
- AS4454 compost
- Acid sulfate soil and rock
- Recovered aggregate / ENM
- Water quality parameters

P: 0438 999 488 - E: eal@scu.edu.au - W: scu.edu.au/eal
 Southern Cross University Lismore NSW 2480

LEESNICO EARTHMOVING

EARTHMOVING CONTRACTORS - 30 YEARS EXPERIENCE

Late model equipment with experienced and qualified operators

We can supply the right equipment for the project

Phone Rohan on
0438 899 271

Email: leesnico@bigpond.com
 89 Farrow Road, Kobbie Creek Qld 4520

PROUD TO BE ASSOCIATED WITH SEE CIVIL

JB J CIVIL PTY LTD

BUILDING SOLID FOUNDATIONS

- Grader Hire
- GPS, UTS millimetre machine control for all final trim works
- Late model, well presented and serviced machines
- Highly skilled operators with extensive knowledge
- Road, Rail, subdivision, civil, mining construction

Phone: 0418 409 131
Email: jp@bjcivil.com





EnviroStraw™
PROVEN REVEGETATION SOLUTIONS

ENVIROSTRAW'S BIOGROWTH REGENERATIVE PROGRAM BRINGS THE SOIL AROUND THE PACIFIC COMPLETE PROJECT TO LIFE



BioGrowth program 4 months on



BioGrowth native plant establishment 10 months on



Inorganic fertiliser 4 months on



Inorganic program 10 months on

The EnviroStraw range of solutions and their trademarked, world-first BioGrowth regenerative revegetation program has transformed the landscape around the project, reviving the soil and allowing grass and natives to grow again.

BioGrowth™ **REVEGETATION PROGRAM**



Inorganic program



BioGrowth program

EnviroStraw and its BioGrowth program has been developed by Australia's leading soil scientists, drawing on over 30 years of research, and the results are taking Australia by storm. The program holistically builds on conventional rehabilitation practices by rejuvenating depleted soils, increasing beneficial microbial activity and increasing soil carbon.

As is evident in these photos from the Pacific Complete project in northern NSW, their products are reviving even the harshest commercial environments. With their scientifically crafted formula, soil is nurtured back to health, paving the way for the establishment of native vegetation.

EnviroStraw's EnviroMatrix ECM product comes in one bag and is complete with built-in nutrients that achieve sustainable growth and work faster, with less water, than standard hydromulch, making it favourable in many of Australia's harsh environments.

No matter the slope, the team at EnviroStraw are confident that their carefully designed and developed range of products accommodate all variants. And this is being backed by results – time and time again their range of products is turning once dry and barren commercial landscapes to green.

And on top of achieving results where others fail, EnviroStraw's revegetation products are environmentally friendly. This company and their products are quickly becoming one of Australia's success stories, and for good reason.

Get in touch on 1300 868 669 or at sales@envirostraw.com.au.

Visit our website envirostraw.com.au for more information.



Maclean Cut

The Maclean cut project was awarded as a variation to the Woodburn to Broadwater service road project. Both packages were part of the Woolgoolga to Ballina Pacific Highway upgrade.

There was two distinct scopes of work for the Maclean Cut package, these were constructing the pavement crossovers and widenings to facilitate future traffic staging at Maclean Cut and Farlows Flat, and preload and foundation treatment of the Yamba interchange area.

SCOPE OF WORKS

Construction of pavement crossovers and widening

- Cleaning, grubbing, topsoil stripping and bulk earthworks;
- Foundation works and select and upper zone material placement;
- Installation of all required drainage and scour protection;
- Installation of permanent fencing and road furniture including guide posts and F-type barrier.

REVEGETATION PROGRAM FOR DISTURBED SOIL

Designed in the lab, tested in the field

Call Today **0409 677 449** or email sales@envirostraw.com.au

www.envirostraw.com.au

Yamba interchange preload and foundation treatment

- Removal of the existing pavement;
- Foundation treatments including installation of drainage layer and wick drains;
- Placement of surcharge materials;
- Installation of surcharge monitoring equipment;
- Installation of required temporary and permanent drainage;
- Temporary stabilisation of earth embankments.



Tyndale Borrow

The Tyndale Borrow package of work was part of the Woolgoolga to Ballina Pacific Highway upgrade.

The Tyndale Borrow package involved the establishment and operation of a borrow site to provide construction materials to the Woolgoolga to Ballina Pacific Highway upgrade.

VOIGHT CONTRACTING

SUPPLIER OF BULK AG LIME, GYPSUM & DOLOMITE

A leading company, established for 30 years, in the transport and civil industries.

Voight Contracting and has immediate access to products, transport, equipment and expertise to cater to individual requirements and suit any project.

Specialising In:

- Supply & Delivery of Bulk Ag Lime, Gypsum, Dolomite
- Treatment of Acid Sulphate Soil & Soil Amelioration, Conditioning
- Grass Seeding & Fertilising
- Slashing and Bulk Mulch Spreading
- Bulk Haulage
- Logistics Solutions



Ph: (07) 3801 8229

Mob: 0412 769 841 | www.voightgroup.com.au

Email: info@voightgroup.com.au

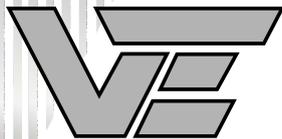


SCOPE OF WORKS

- Clearing and grubbing, including Topsoiling and Mulching;
- Development and Operation of the Borrow Site:
- Winning (extraction drill and blast)
- Processing (crushing and screening)
- 425,000T of R44 Select Material
- 65,000T of R44 Verge Material
- Stockpiling of processed material types
- Conformance testing (as per the relevant RMS Specification)
- Loading of conformed material (or for transfer to a nominated stockpile location)
- Hauling of conformed material directly to site (from the borrow, or a nominated stockpile location)
- Construction & Maintenance of the access haul road
- Rehabilitation & Demobilisation

Subcontractors and Suppliers

- Adept Plant Hire
- All About Lifting
- Andrew Harris Engineering
- Australian Construction Products
- BD & MC Lewis
- Best Contractors
- BPE Contractors
- Cable & Pipe
- Cavanba
- CDA Eastlands
- Coastal Concrete
- Conplant
- D & D Projects Ply Ltd
- DBL Excavations
- East Coast Kerbing
- Ellis Profiling
- Enviro Consulting
- Envirostraw Pty Ltd
- Geofabrics
- Geolink
- Growgrass Hydromulching
- Harris Crane & Equipment hire
- Hi-Way Stabilizers
- Hughes Contracting
- JBJ Civil
- Leesnico
- Maccer
- MDK Tipper Hire
- Mega Waste Industries Pty Ltd
- Montb Services
- Native Seed
- Newman Quarrying
- North Coast Road Sweepers
- NR Signs
- Ongrade Plant & Haulage
- Precast Civil
- Precision Screen
- Quarry Solutions
- Richmond Sand
- Roadside Products
- Ryan Earthmoving
- Southern Cross University
- SRB Excavations Pty Ltd
- Universal Cranes
- VE Group
- Voight Contracting
- Wicks and Parker
- WW Survey



GROUP_{AU}

VE GROUP - one of Australia's leading earthmoving, civil construction and logistics specialists.

Our origins are originally from the country, but our future is taking on a mixture of projects across high-density urban environments and regional and remote works.

VE Group is located in Central Qld, South East Qld and Northern New South Wales, our business is able to continue to offer services to wider locations. Our South East QLD division is focused on showcasing a wide range of our products such as sandstone and landscaping supplies. This depot caters for a vast range of clientele capturing all types of projects ranging from residential to large commercial requirements.

Specialising In:

- Heavy Haulage
- Transport
- Civil Construction
- Sandstone and Rock Supply
- Plant Hire

Phone: (07) 3816 1002
www.vegroup.com.au

EMAIL: info@vegroup.com.au | ADDRESS: 219 Riverview Road, Riverview QLD 4303





BKM tipper trucks are used for concrete paving and earthworks. Our tipper trucks have been built with a lower tare weight which makes them a more viable option when paving. **BKM** water trucks have a carrying capacity of 13000 litres complete with water cannon, high pressure gun and sludge pumps.

BKM understands the importance on continuity on projects and have a fully qualified Heavy Diesel Mechanic in charge of maintaining the fleet. When servicing projects and having service trucks available ensures a reliable fleet without interrupting supply.

We are mindful of how important the transport and supply of concrete is to our clients achieving a quality project outcome. This is why we have built our business around understanding our client's needs, and developing quality systems around the supplying of concrete.

Due to our experience in the concrete transportation industry, our clients have an opportunity to minimise the risk on their project by employing a reputable concrete cartage company that gets the job done with ease every time.

Whatever concrete cartage solutions you require for your next project, we can assist you with supplying concrete on time and on budget. We pride ourselves on providing a quality service, which incorporates professionalism, coupled with a reliable fleet of trucks.

For more information on our concrete transport services, contact us today. Choose **BKM** to set the success of your construction project in stone.

BKM Contracting are professional suppliers of Concrete Agitator, Tipper truck and Water truck hire throughout Australia wide.

They have been in the concrete industry since 1987, and pride themselves on supplying a reliable service for a diverse range of projects.

BKM supply concrete agitator trucks to Construction companies that have onsite concrete batch plants and to major concrete companies, fixed/onsite plants for concrete delivery.

Being a concrete carter to construction sites is a specialised area and **BKM Contracting** has built a sound reputation making them a sought after provider for concrete agitator hire.



CONCRETE AGITATOR, TIPPER & WATER TRUCK HIRE

BKM prides itself on providing customers with reliable, professional service.

Phone: 0418 776 466 | Email: info@bkmcontracting.com | Web: www.bkmcontracting.com



Envirodata

Weather Station Specialists

One of Australia's leading designers, manufacturers and installers of commercial weather stations, Envirodata Weather Stations Pty Ltd, is proud to have supplied Pacific Complete's Weather Stations on the Pacific Highway Upgrade project.

"Particularly in the road construction industry, weather impacts what activities can be undertaken on a day-to-day basis. There's clauses in contracts for rain delays as there's obvious impacts on construction programs and safety, heat stress for human capital on the project, or to monitor potential runoff for erosion and sediment control," said Matthew Proberts, Envirodata Weather Stations' Sales Manager.

Envirodata installed, maintained and operated up to 28 weather stations across the Pacific Highway Upgrade, under a number of contracts for several different construction firms plus 21 systems directly for Pacific Complete. Most stations had a 10m mast

and they all met Australian Standards and the RMS R272 QA requirements for these works.

"The Weather Stations have to be supplied by a weather station panel member, so the device and its sensors meet exacting standards for quality, accuracy and reliability. We're totally Australian-Made – that means we are industry leaders in providing competitive solutions as well as ongoing support and maintenance," said Matthew.

The weather data can be viewed on a web-based browser on a laptop, desktop or mobile device and users can customize the format, and receive alerts and notifications based on the weather or at set intervals. This allows accurate planning of construction works with up-to-the-minute reliability, as well as being able to respond to environmental compliance issues.

With updates from each weather station every minute, your ability to work with the weather is truly immediate. Importantly, the data has to be accurate and be relied upon even to stand up in court if there are environmental issues.

"We pride ourselves the web interface is very user friendly and intuitive. It is designed to be easy to use for all of our users. We provide your weather data where you need it, when you need it and how you need it and it's very secure," Matthew said.

Envirodata Weather Stations was established in 1982 and currently employs 12 people from its Queensland base but operates throughout Australia and overseas. They have a service department with staff constantly on the road installing weather stations and calibrating equipment around the country for construction, industrial and mining clients.

For more information contact
Envirodata Weather Stations Pty Ltd
Phone: (07) 4661 4699
Email: sales@envirodata.com.au
Web: www.envirodata.com.au

ROBUST, RELIABLE & AUSTRALIAN ROAD WEATHER STATIONS



Your Weather Data
- when & how you need it!

Live & Historic Weather online & SMS and Email Alerts

NSW RMS R272 QA Spec Delivered at over 35 sites

Extended Warranty and high level Backup & Support



Call us on **07 4661 4699**

www.envirodata.com.au



GMC Environmental Consulting (and project works company Shingleback Environmental Project Services) is proud to be a part of the W2B Pacific Highway Upgrade Koala Tree Revegetation Project. GMC has worked with NSW RMS across a number of land remediation projects including the Holbrook and Grong Grong Bypasses, and now across a number of sections of the Woolgoolga to Ballina Pacific Highway Upgrade.

GMC has contributed project and landscape management services for the W2B Pacific Highway Upgrade since 2016. Guy Corbett, **GMC's** director who has been actively involved in the Pacific Highway upgrade comments,:

“**GMC** has a long and proud relationship with Roads and Maritime Services and we are pleased to have maintained a long-term involvement in the Pacific Highway upgrade, delivering a healthy and well established koala habitat across 130 hectares near Ballina NSW”.

Across all the completed works on the highway project, **GMC** has gained a reputation for innovation and quality excellence by undertaking all works with the established aim to deliver high quality mature landscapes.

GMC is an environmental consultancy firm, offering revegetation services across Australia. We specialise in the design, procurement, delivery, maintenance and management of landscaping, and rehabilitation works.

GMC is at the forefront in the use of consistent approaches to land remediation and landscape works. We provide innovative and sustainable solutions for environmental projects, helping to improve efficiency and client outcomes across all works.

In partnering with our clients, we deliver excellence across the life of a project, regardless of size, complexity or location.

Our Services Include:

- Environmental consulting/planning
- Broad acre revegetation projects
- Civil landscaping construction
- Civil infrastructure projects
- Road construction landscaping
- Integrated project management
- Revegetation planting including tube stock planting
- Erosion control assessment & installation services
- Landscape maintenance
- Hand sowing
- Mechanical direct seeding

To discuss how GMC can assist with your project needs, please contact Guy Corbett on Ph: 0419 648 171 or guy@gmcenviro.com.au



Our Services:

- Environmental Consulting & Planning
- Revegetation planting including tube stock planting
- Civil Landscape Works
- Erosion Control assessment & installation services
- Soil Testing
- Hand Sowing
- Mechanical direct seeding
- Landscape maintenance



Contacts:

- Guy Corbett – 0419 648 171 – guy@gmcenviro.com.au
- Andrew Kilby – 0410 597 929 – andrew@gmcenviro.com.au

Guardrail Installations Australia



Guardrail Installations Australia (GIA) begins another exciting chapter this year under new ownership.

Managing Director Jason Maxwell has purchased the Newcastle-based business that was first established in Victoria in 2008.

The new owner has extensive experience in the construction industry having completed a Bachelor of Construction Management, at Newcastle University, in 2002.

Jason has worked on major construction projects throughout Australia and internationally for companies including Lend Lease, Leightons and John Holland.

Over the past 20 years Jason has developed a client-focused management style with a strong emphasis on

meeting expectations in relation to communication, programming, WHS&E and quality.

Jason is excited about the company's next challenge, and has added an additional crew to expand operations this year.

"I look forward to taking Guardrail Installations Australia to the next level, cementing relationships with existing clients and growing the business throughout Australia," he said.

"We aim to be a market leader in work health and safety and offer innovative ideas, state-of-the-art equipment and training."

With a strategic objective to deliver a superior product and service, Guardrail Installations Australia is a specialist supplier and installer of all safety barrier systems.

The company's commitment to excellent service has seen its growing reputation generate increasing work.

Extensive work has been carried out on the M1 extension on the north coast of NSW, connectivity projects in Sydney, upgrades and repairs for local government and works for Transport NSW.

"Over the next year with an additional crew in place, we aim to respond quicker to clients' needs," Jason said.

"We are also planning to have our integrated management system (IMS) certified to ISO 45001, 14001 and 9001."

It's easy to see why GIA's motto is, 'We'll stand behind our work'.



GUARDRAIL INSTALLATIONS

Guardrail Installations Australia's strategic objective is to deliver a superior product and service to all clients.

GIA continues to develop as one of Australia's leading specialist supplier and installer of safety barrier systems.

We operate out of Newcastle, New South Wales, but are willing to visit any job site across Australia.

The company has invested heavily in the latest European technology.

We have specialist, hydraulic, Pauselli guardrail installing machines that provide greater reliability, efficiency and service.

We provide technical and engineering advice on all job sites and equipment.

Guardrail Installations Australia supply and install these road safety barrier systems:

- Steel Beam Safety Barrier Systems
- Wire Rope Safety Barrier Systems
- Bridge Rail
- Box Beam Rail
- Crash Attenuators or Crash Cushions
- Temporary Safe Guard Barrier Systems
- Plastic Motorcycle Rub-Rail Specialist
- Rock Drilling
- Concrete Core Drilling
- Post Extraction
- Solar Farms

Jason Maxwell
Managing Director
Mobile: 0498 114 211
jason@guardrailinstallations.com.au
www.guardrailinstallations.com
Newcastle, NSW, Australia

BENEFITS GUARDRAIL INSTALLATIONS HAS TO OFFER:

- Client focused
- Providing the best quality & service.
- On site reliability. Latest equipment and technology. Highly skilled and specialist crews.
- Professional engineering staff to provide technical advice and assistance.
- Expansive mobilisation to any part of Australia.
- Australian company.
- CCF pre qualified contractor

Proud to be associated with BMD on the Woolgoolga to Ballina project

WE'LL STAND BEHIND OUR WORK

Engineered Timber Bridge System a Lifeline for State's Deteriorating Timber Bridges



Timber specialist and plywood manufacturer, **Big River Group**, has launched a full timber bridge refurbishment system, manufactured in Grafton, New South Wales, from its chain of custody certified timber mill, as a cost effective and quick installation solution for the reconditioning and refurbishing of timber bridges.

Bridges form a vital part of Australia's transport network, with around 30,000 timber road bridges in service throughout the country. However, heavier and faster moving vehicles have put a considerable strain on these old timber bridges, accelerating the rate at which many of these ageing timber structures have been deteriorating.

As a way to extend the life of timber bridges a full Engineered Bridge system was developed by Big River Group, and includes engineered decking, engineered girder beams, headstocks, corbels and kerbing, as a cost effective solution to steel and concrete alternatives. The system is an engineered substitute for traditional hardwood timbers and its install speed, a critical measure of its success.

The longer length engineered bridge decking product available up to 14 metres for a single span, offers quick installation. When complemented with engineered girder beams, head stocks and corbels the strength to weight ratio combination of the system increases the live load capacity of structures up to 22 per cent, and is up to 35 percent stronger than traditional timbers, therefore extending the life of the timber structure it's installed on and using less natural resource.

A retrofit engineered solution, with a H5 treated 40 year design life that meets T44 and S1600 loadings, means the Big River bridge system can extend the life of timber bridges by decades. The system is certified to replace all round or sawn timbers of the same section sizes in F22 and F27, and offers a low-cost option for rehabilitating existing, older timber structures without needing to replace the entire bridge. All components are manufactured from a renewable plantation timber resource, providing a negative carbon footprint, meaning it stores 17 times more carbon than is released to manufacture.

Faster to install due to its light weight, the Big River bridge system can be moved in larger sections with the same machinery used for alternative materials, so less trucks are required for delivery and less crane movement to install components is needed.

Additionally, as a timber-based product, environmental impact is minimal with a lower carbon footprint than concrete and steel bridges. Most of the machinery alterations such as drilling, can be done on site with traditional skills and tools. This, together with the lightweight material, means installation can occur in a timely manner, with minimal disruption to local traffic and the community.

The Cedar Creek Bridge in Cessnock, New South Wales, was given a new lease of life in less than a week. As one of 74 bridge assets in the Cessnock local government area, the ageing timber bridge was highlighted as a priority for urgent restoration given the significant deterioration of the corbels, girders and deck planks. Heavier vehicle usage had caused vibration in the bridge as they passed over; this can cause bolts and fasteners to rattle loose over time requiring higher maintenance and causing increase wear to the joints in the timber. The council had implemented a six-tonne load limit on the bridge as a short-term solution while it searched for a low-cost alternative to a steel or concrete replacement, both of which come at significant costs to the community.



Using Big River Group's Engineered Timber Bridge System, the bridge restoration took just three days – four days ahead of schedule – with the council contracting two work crews around-the-clock to restore it quickly.

In full consultation with the residents, the council managed issues of transport and water, with a shuttle bus made available to transport residents to and from their properties, and a pedestrian walk bridge was maintained throughout the project to enable continued access for those getting around on foot. Cessnock City Council estimates that to take the old bridge down and replace it with a new steel and concrete bridge would take a minimum of two months, likely even longer.

For further information on the Big River bridge system please contact Big River Group on 1300 88 1958.

Refurbishing a timber bridge and require T44 and SM1600 loading?

Big River Group provides a cost effective and time efficient solution with structural plywood, headstocks, corbels, curbing and girders for your next timber bridge project.



We're located Nationally, contact us for more information **1300 88 1958**



MCS Telebelts: A Straight Answer for Roundabout Questions



Mobile Conveying Services (MCS) is the leading mobile bulk materials placement specialist in Australia. Its fleet of Telebelt telescopic conveyors operates around the country in construction, mining and shipping applications. Truck unloaders, radial stackers, link conveyors and gravity stockpile reclaimers are also offered; and other equipment can be designed and built in the MCS factory to suit special needs not met by standard equipment.

At The Heart of the Telebelt Fleet are the:

- TB 110 (32m placement belt, 10.6m feed belt), and
- TB 130 (39m placement belt, 10.6m feed belt).

Features Include:

- independent control of the positioning of feed and placement belts
- high placement rates where supply can be maintained
- quiet operation (can work close to houses, etc.)
- no moving equipment near workers (the Telebelt is set up away from the work area, the boom is well above head height and the suspended placement chute can be guided by hand)
- remote control operation (primary operator can see and react to issues in the placement area)
- can work in low headroom applications e.g. under power lines
- highly reliable (material passes over a belt, not through a tube)
- highly skilled, experienced operators
- minimal material wastage in concrete placement applications
- can place steel fibre and low slump concretes that are difficult to pump
- fast clean-up (Telebelt can place multiple materials on a site if required)
- fast relocation (for larger jobs)
- range of feed hoppers to suit different materials and different loading equipment
- precise control (can work up to edges, around obstructions, place at close to level with minimal finishing required).

Recently Fulton Hogan engaged MCS to supply and operate a TB 110 for staged placing of steel fibre concrete in the construction of a large concrete roundabout designed to handle heavy vehicles. This was part of associated

works for the New Grafton Bridge project, for which RMS engaged Fulton Hogan on a design and build basis.

This was the first use of a Telebelt for this type of work in Australia; and was followed by work for the Gunnedah Shire Council in delivering a similar project for RMS. Part of this project was delivered by conventional means prior to the arrival of the Telebelt.



Feedback From this Project Was:

- The projected placement time for the Telebelt section of work, based on earlier works completed using alternative means, was 25 days. The Telebelt delivered the work in 15 days.
- There was significant risk of blockages if a pump was used, which could result in damage of \$40-100k, as well as delays.
- With a pump, 0.6–0.7 m³ of concrete could be lost when loading for the first time - not an issue with the Telebelt.

While Telebelts were originally designed for placing concrete and have been used on some of the largest mass concrete placement projects in the world, they also suit a host of other materials such as filter materials for bio basins, placing soil for landscaping and reinstatement works, placing rock for gabion retaining walls, placing road base, bedding sand, etc.

MOBILE

CONVEYING SERVICES

PTY LTD

Your Telebelt specialist in Australia:

- Range of truck-, carrier- and trailer-mounted telescopic conveyors to suit both short-term and project work
- Trained, highly skilled operators
- Equipment maintained to factory standards in company workshop
- High placement rates when material supply can be maintained
- Highly reliable – no squeeze points in operation
- Accurate placement to level – only hand finishing required
- Able to work in confined spaces and where there is no direct access for mobile equipment
- Remote control, with operator at the placement location
- Can stop and start the belt where supply is intermittent
- Suits placement of concrete that is difficult to pump: no expensive additives, lowering concrete cost
- Fast clean-up with no wastage of material

Telebelts suit a range of materials, including:

- Concrete
- Soil
- Gabion rock
- Sand
- Mulch
- Bulk commodities
- Gravel

Common applications include:

- Fibre concrete for slabs (internal & external)
- No fines concrete
- Filter materials for bio retention basins
- Backfilling underground tanks and arched culverts (fine control provides even side loading)
- Ship & barge loading
- Rail ballast placement (reverse conveyor mode also allows old ballast to be extracted and placed directly into tipper)
- Wide range of difficult access applications (all materials)

MCS specialises in mobile and portable bulk transfer equipment and systems

- Wet hire of Telebelt mobile telescopic conveyors
- Wet & dry hire, tonnage rate or contract price for radial stackers, truck unloaders, link conveyors
- Sale of Superior conveyors, Ashross truck & train unloaders
- Design & manufacture of equipment & systems to suit special requirements



Phone: 1300 665 409 Fax: 1300 665 438

Web: www.mobileconveyors.com.au

Email: enquiries@mobileconveyors.com.au

631 Uhlmann Road, Burpengary East QLD 4505 | PO Box 608, Narangba QLD 4504

Australian Civil Solutions



Australian Civil Solutions is a privately-owned company, associated with pipeline installation and civil engineering works.

We are excited to be working throughout Australia, learning and developing new skills and processes along the way. Our culture is based on the principles of sustainability and continuous improvement.

Our Vision

At ACS our goal is to be the contractor of choice for civil construction. We ensure that all targets are beaten and that our work is of the highest standard.

We are constantly focused on developing new methods/processes to make us more competitive.

We will make every effort to be known as the company that do things a little different!

Services

Australian Civil Solutions offer wet and dry hire options for a range of machinery, Australian Civil Solutions specialise in civil construction works, engaging on several projects throughout Australia. Our rubber tyred excavators have proven to be expectational tool's on all projects.

We also offer a broad range of Plant/Equipment & Pipe-laying services for our customers ensuring their needs are met.

All contracts are competitively priced and are quoted based on the individual job. Australian Civil solutions runs a 24hr service for its customers.

At ACS we believe that the safety of our team is Number 1. All team members are trained and upskilled as needed and are provided with the correct tools & coaching work to fully understand the task ahead.

Our employees are covered under our Fair Work Australia agreement (Australian Civil Solutions EA 2016).

Australian Civil Solutions is committed to setting the highest standards placing extra emphasis on housekeeping of our Plant/Projects.

Our Commitment

At Australian Civil Solutions we are always looking to improve our processes.

We welcome all challenges & with our focus on Collaboration & Innovation the possibilities are endless!

Australian Civil Solutions offer a range of project based services

Specialising In:

- Drainage & Utility Installation:
- Stormwater Infrastructure.
- Water/Sewer Installation.
- Electrical/ Communications Installation
- On Site Welding & Engineering Services:
- Fabrication of re-inforcement cages
- Project specific Tools & Attachments

Equipment Hire:

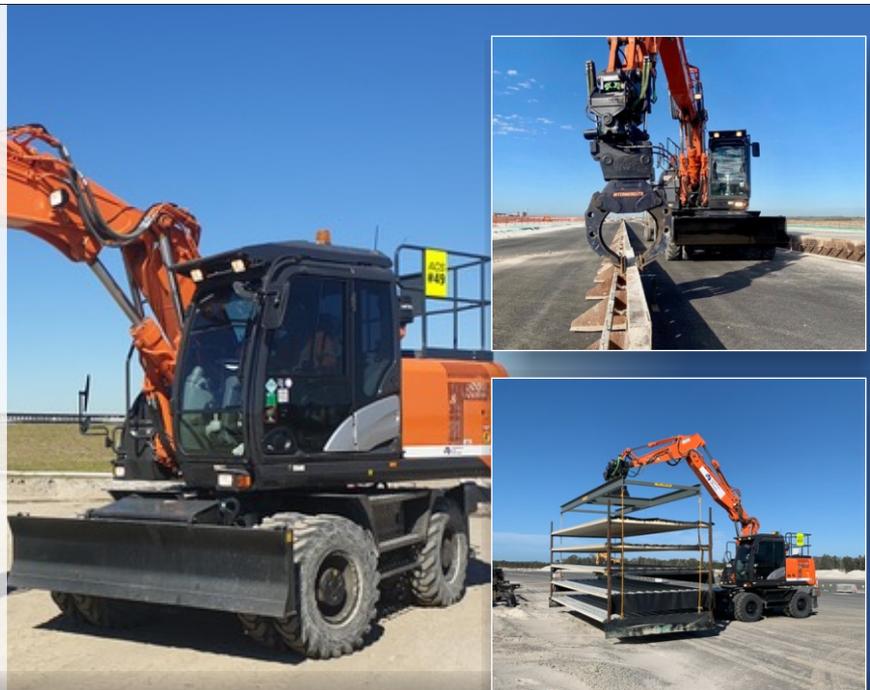
- Wheeled Excavators 6-26T.(3D GPS Ready)
- Tracked Excavator 6-40T.(3D GPS Ready)
- Wheel Loaders/Tool Carriers 13-24T.
- Water Truck/Trailer 1000L-13000L
- Track Loaders 2.5-5T.
- Telehandlers 2.5-10T
- Float Hire.

All equipment is Tier 1 compliant and are fitted with Tilt Hitches, Height & Slew Restrictors.

All contracts are competitively priced and are quoted based on the individual job.

Australian Civil Solutions runs a 24hr service for its customers.

Please contact us for further information or a quote today.



Phone: (07) 3490 8465
www.australiancivilsolutions.net.au

Mob - Tom Daly: 0403 526 369
E: tomdaly@australiancivilsolutions.net.au
E: accounts@australiancivilsolutions.net.au
25/193 Southpine Road Brendale, QLD, 4500

